PUB. 193

SAILING DIRECTIONS (ENROUTE)

★

SKAGERRAK AND KATTEGAT

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THIRTEENTH EDITION

Preface

Pub. 193, Sailing Directions (Enroute) Skagerrak and Kattegat, Thirteenth Edition, 2010, is issued for use in conjunction with Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea. Companion volumes are Pubs. 191, 192, 194, and 195.

Digital Nautical Charts 21 and 22 provide electronic chart coverage for the area covered by this publication.

This publication has been corrected to 21 August 2010, including Notice to Mariners No. 34 of 2010.

Explanatory Remarks

Sailing Directions are published by the National Geospatial-Intelligence Agency (NGA), under the authority of Department of Defense Directive 5105.40, dated 12 December 1988, and pursuant to the authority contained in U. S. Code Title 10, Sections 2791 and 2792 and Title 44, Section 1336. Sailing Directions, covering the harbors, coasts, and waters of the world, provide information that cannot be shown graphically on nautical charts and is not readily available elsewhere.

Sailing Directions (Enroute) include detailed coastal and port approach information which supplements the largest scale chart produced by the National Geospatial-Intelligence Agency. This publication is divided into geographic areas called "Sectors."

Bearings.—Bearings are true, and are expressed in degrees from 000° (north) to 360°, measured clockwise. General bearings are expressed by initial letters of points of the compass (e.g. N, NNE, NE, etc.). Adjective and adverb endings have been discarded. Wherever precise bearings are intended degrees are used.

Charts.—Reference to charts made throughout this publication refer to both the paper chart and the Digital Nautical Chart (DNC).

Coastal Features.—It is assumed that the majority of ships have radar. Available coastal descriptions and views, useful for radar and visual piloting are included in geographic sequence in each Sector.

Corrective Information.—Users should refer corrections, additions, and comments to NGA's Maritime Operations Desk, as follows:

1. Toll free: 1-800-362-6289
2. Commercial: 301-227-3147
3. DSN: 287-3147
4. DNC web site: http://www.nga.mil/NGAPortal/DNC.portal
5. Maritime Domain web site: http://www.nga.mil/NGAPortal/MSI.portal
6. E-mail: navsafety@nga.mil
7. Mailing address: Maritime Domain
   National Geospatial-Intelligence Agency
   Mail Stop D-44
   4600 Sangamore Road
   Bethesda MD 20816-5003

New editions of Sailing Directions are corrected through the date of the publication shown above. Important information to amend material in the publication is available as a Publication Digital Update (PDU) from the NGA Maritime Domain website.

NGA Maritime Domain Website
http://www.nga.mil/NGAPortal/MSI.portal

Courses.—Courses are true, and are expressed in the same manner as bearings. The directives "steer" and "make good" a course mean, without exception, to proceed from a point of origin along a track having the identical meridianal angle as the designated course. Vessels following the directives must allow for every influence tending to cause deviation from such track, and navigate so that the designated course is continuously being made good.

Currents.—Current directions are the true directions toward which currents set.

Dangers.—As a rule outer dangers are fully described, but inner dangers which are well-charted are, for the most part, omitted. Numerous offshore dangers, grouped together, are mentioned only in general terms. Dangers adjacent to a coastal passage or fairway are described.

Distances.—Distances are expressed in nautical miles of 1 minute of latitude. Distances of less than 1 mile are expressed in meters, or tenths of miles.

Geographic Names.—Geographic names are generally those used by the nation having sovereignty. Names in parentheses following another name are alternate names that may appear on some charts. In general, alternate names are quoted only in the principal description of the place. Diacritical marks, such as accents, cedillas, and circumflexes, which are related to specific letters in certain foreign languages, are not used in the interest of typographical simplicity. Geographic names or their spellings do not necessarily reflect recognition of the political status of an area by the United States Government.

Heights.—Heights are referred to the plane of reference used for that purpose on the charts and are expressed in meters.

Index-Gazetteer.—Navigational features and place-names are listed alphabetically in the back of the book. The approximate position, along with the Sector and paragraph numbers (e.g. **1.1**), facilitate location in the text.

Internet Links.—This publication provides internet links to web sites concerned with maritime navigational safety, including but not limited to, Federal government sites, foreign Hydrographic Offices, and foreign public/private port facilities. NGA makes no claims, promises, or guarantees concerning the accuracy, completeness, or adequacy of the contents of the web sites and expressly disclaims any liability for errors and omissions of these web sites.

Light and Fog Signals.—Lights and fog signals are not described, and light sectors are not usually defined. The Light Lists should be consulted for complete information.

Ports.—Directions for entering ports are depicted where appropriate by means of chartlets, sketches, and photos, which facilitate positive identification of landmarks and navigational

aids. These chartlets and sketches are not always to scale, however, and should be used only as a general informational guide in conjunction with the best scale chart. Specific port facilities are omitted from the standard format. They are tabulated in Pub. 150, World Port Index.

Radio Navigational Aids.—Radio navigational aids are not described in detail. Publication No. 117 Radio Navigational Aids and NOAA Publication, Selected Worldwide Marine Broadcasts, should be consulted.

Soundings.—Soundings are referred to the datum of the charts and are expressed in meters.

Special Warnings.—A Special Warning may be in force for the geographic area covered by this publication. Special Warnings are printed in the weekly Notice to Mariners upon promulgation and are reprinted annually in Notice to Mariners No. 1. A listing of Special Warnings currently in force is printed in each weekly Notice to Mariners, Section III, Broadcast Warnings, along with the notice number of promulgation. Special Warnings are also available on the Maritime Division website.

Wind Directions.—Wind directions are the true directions from which winds blow.

Reference List

The principal sources examined in the preparation of this publication were:

British Hydrographic Department Sailing Directions.
Danish Sailing Directions.
Norwegian Sailing Directions.
Swedish Sailing Directions
Various port handbooks.

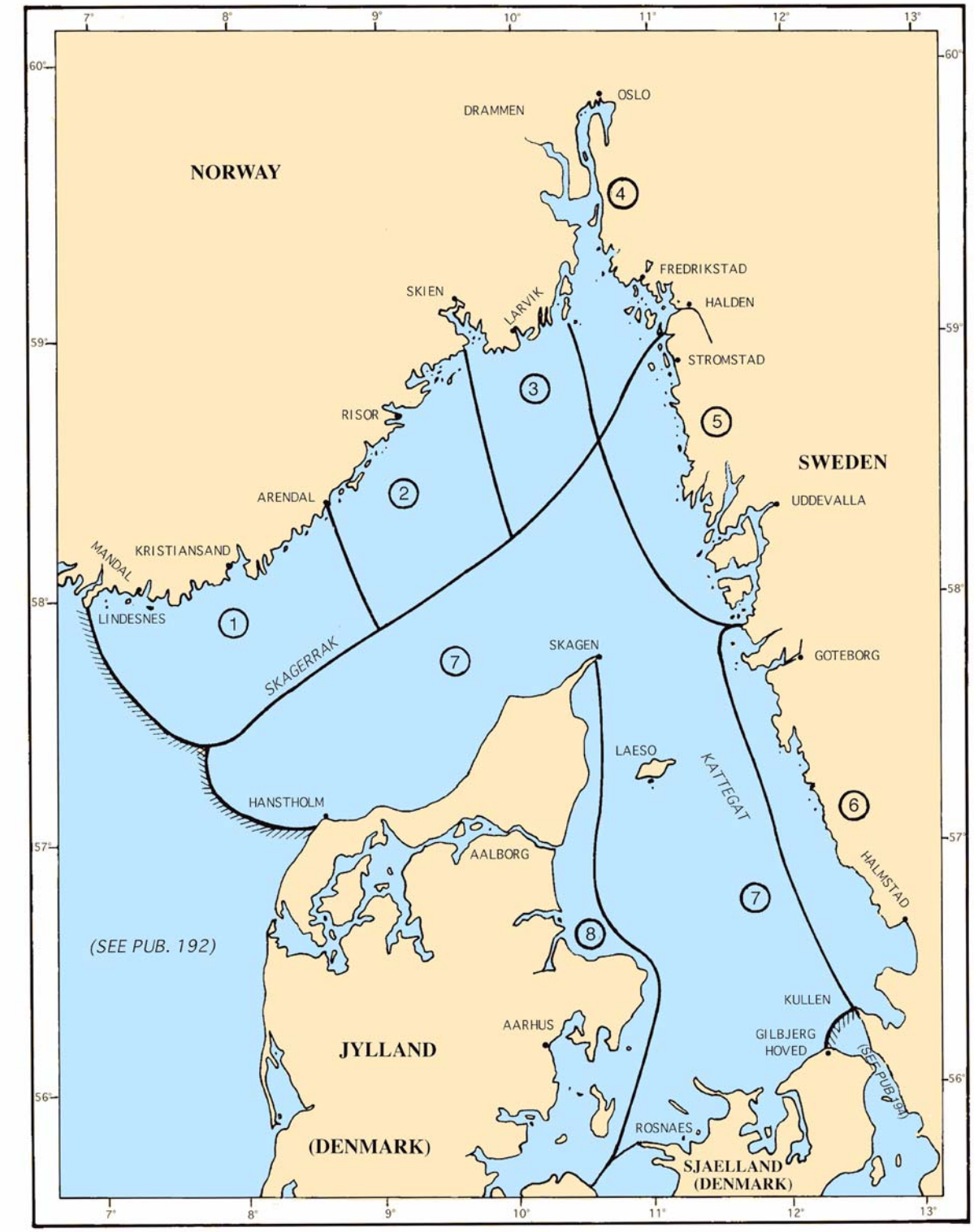
Reports from United States Naval and merchant vessels and various shipping companies.

Other U.S. Government publications, reports, and documents.

Charts, light lists, tide and current tables, and other documents in possession of the Agency.

Internet web sites as, follows:

1. Carter, Donald and Diana (Internet Public Library)
   http://www.ipl.org/exhibit/light
2. Frederikshavn, Denmark
   http://www.frederikshavn.dk
3. Halmstad Port and Stevedoring Company
   http://www.halmstadharbour.se
4. Moss-Shipping
   http://www.moss-shipping.com
5. Terminal West AB
   http://www.twab.se
6. Varberg, Sweden
   http://www.varberg.se



SECTOR LIMITS — PUB. **193**

Feet to Meters

Feet	0	1	2	3	4	5	6	7	8	9
0	0.00	0.30	0.61	0.91	1.22	1.52	1.83	2.13	2.44	2.74
10	3.05	3.35	3.66	3.96	4.27	4.57	4.88	5.18	5.49	5.79
20	6.10	6.40	6.71	7.01	7.32	7.62	7.92	8.23	8.53	8.84
30	9.14	9.45	9.75	10.06	10.36	10.67	10.97	11.28	11.58	11.89
40	12.19	12.50	12.80	13.11	13.41	13.72	14.02	14.33	14.63	14.93
50	15.24	15.54	15.85	16.15	16.46	16.76	17.07	17.37	17.68	17.98
60	18.29	18.59	18.90	19.20	19.51	19.81	20.12	20.42	20.73	21.03
70	21.34	21.64	21.95	22.25	22.55	22.86	23.16	23.47	23.77	24.08
80	24.38	24.69	24.99	25.30	25.60	25.91	26.21	26.52	26.82	27.13
90	27.43	27.74	28.04	28.35	28.65	28.96	29.26	29.57	29.87	30.17

Fathoms to Meters

Fathoms	0	1	2	3	4	5	6	7	8	9
0	0.00	1.83	3.66	5.49	7.32	9.14	10.97	12.80	14.63	16.46
10	18.29	20.12	21.95	23.77	25.60	27.43	29.26	31.09	32.92	34.75
20	36.58	38.40	40.23	42.06	43.89	45.72	47.55	49.38	51.21	53.03
30	54.86	56.69	58.52	60.35	62.18	64.01	65.84	67.67	69.49	71.32
40	73.15	74.98	76.81	78.64	80.47	82.30	84.12	85.95	87.78	89.61
50	91.44	93.27	95.10	96.93	98.75	100.58	102.41	104.24	106.07	107.90
60	109.73	111.56	113.39	115.21	117.04	118.87	120.70	122.53	124.36	126.19
70	128.02	129.85	131.67	133.50	135.33	137.16	138.99	140.82	142.65	144.47
80	146.30	148.13	149.96	151.79	153.62	155.45	157.28	159.11	160.93	162.76
90	164.59	166.42	168.25	170.08	171.91	173.74	175.56	177.39	179.22	181.05

Meters to Feet

Meters	0	1	2	3	4	5	6	7	8	9
0	0.00	3.28	6.56	9.84	13.12	16.40	19.68	22.97	26.25	29.53
10	32.81	36.09	39.37	42.65	45.93	49.21	52.49	55.77	59.06	62.34
20	65.62	68.90	72.18	75.46	78.74	82.02	85.30	88.58	91.86	95.14
30	98.42	101.71	104.99	108.27	111.55	114.83	118.11	121.39	124.67	127.95
40	131.23	134.51	137.80	141.08	144.36	147.64	150.92	154.20	157.48	160.76
50	164.04	167.32	170.60	173.88	177.16	180.45	183.73	187.01	190.29	193.57
60	196.85	200.13	203.41	206.69	209.97	213.25	216.54	219.82	223.10	226.38
70	229.66	232.94	236.22	239.50	242.78	246.06	249.34	252.62	255.90	259.19
80	262.47	265.75	269.03	272.31	275.59	278.87	282.15	285.43	288.71	291.99
90	295.28	298.56	301.84	305.12	308.40	311.68	314.96	318.24	321.52	324.80

Meters to Fathoms

Meters	0	1	2	3	4	5	6	7	8	9
0	0.00	0.55	1.09	1.64	2.19	2.73	3.28	3.83	4.37	4.92
10	5.47	6.01	6.56	7.11	7.66	8.20	8.75	9.30	9.84	10.39
20	10.94	11.48	12.03	12.58	13.12	13.67	14.22	14.76	15.31	15.86
30	16.40	16.95	17.50	18.04	18.59	19.14	19.68	20.23	20.78	21.33
40	21.87	22.42	22.97	23.51	24.06	24.61	25.15	25.70	26.25	26.79
50	27.34	27.89	28.43	28.98	29.53	30.07	30.62	31.17	31.71	32.26
60	32.81	33.36	33.90	34.45	35.00	35.54	36.09	36.64	37.18	37.73
70	38.28	38.82	39.37	39.92	40.46	41.01	41.56	42.10	42.65	43.20
80	43.74	44.29	44.84	45.38	45.93	46.48	47.03	47.57	48.12	48.67
90	49.21	49.76	50.31	50.85	51.40	51.95	52.49	53.04	53.59	54.13

The following abbreviations may be used in the text:

Units

°C	degree(s) Centigrade	km	kilometer(s)
cm	centimeter(s)	m	meter(s)
cu.m.	cubic meter(s)	mb	millibars
dwt	deadweight tons	MHz	megahertz
FEU	forty-foot equivalent units	mm	millimeter(s)
grt	gross registered tons	nrt	net registered tons
kHz	kilohertz	TEU	twenty-foot equivalent units

Directions

N	north	S	south
NNE	northnortheast	SSW	southsouthwest
NE	northeast	SW	southwest
ENE	eastnortheast	WSW	westsouthwest
E	east	W	west
ESE	eastsoutheast	WNW	westnorthwest
SE	southeast	NW	northwest
SSE	southsoutheast	NNW	northnorthwest

Vessel types

LASH	Lighter Aboard Ship	ro-ro	Roll-on Roll-off
LNG	Liquified Natural Gas	ULCC	Ultra Large Crude Carrier
LPG	Liquified Petroleum Gas	VLCC	Very Large Crude Carrier
OBO	Ore/Bulk/Oil		

Time

ETA	estimated time of arrival	GMT	Greenwich Mean Time
ETD	estimated time of departure	UTC	Coordinated Universal Time

Water level

MSL	mean sea level	LWS	low water springs
HW	high water	MHWN	mean high water neaps
LW	low water	MHWS	mean high water springs
MHW	mean high water	MLWN	mean low water neaps
MLW	mean low water	MLWS	mean low water springs
HWN	high water neaps	HAT	highest astronomical tide
HWS	high water springs	LAT	lowest astronomical tide
LWN	low water neaps		

Communications

D/F	direction finder	MF	medium frequency
R/T	radiotelephone	HF	high frequency
GMDSS	Global Maritime Distress and Safety System	VHF	very high frequency
LF	low frequency	UHF	ultra high frequency

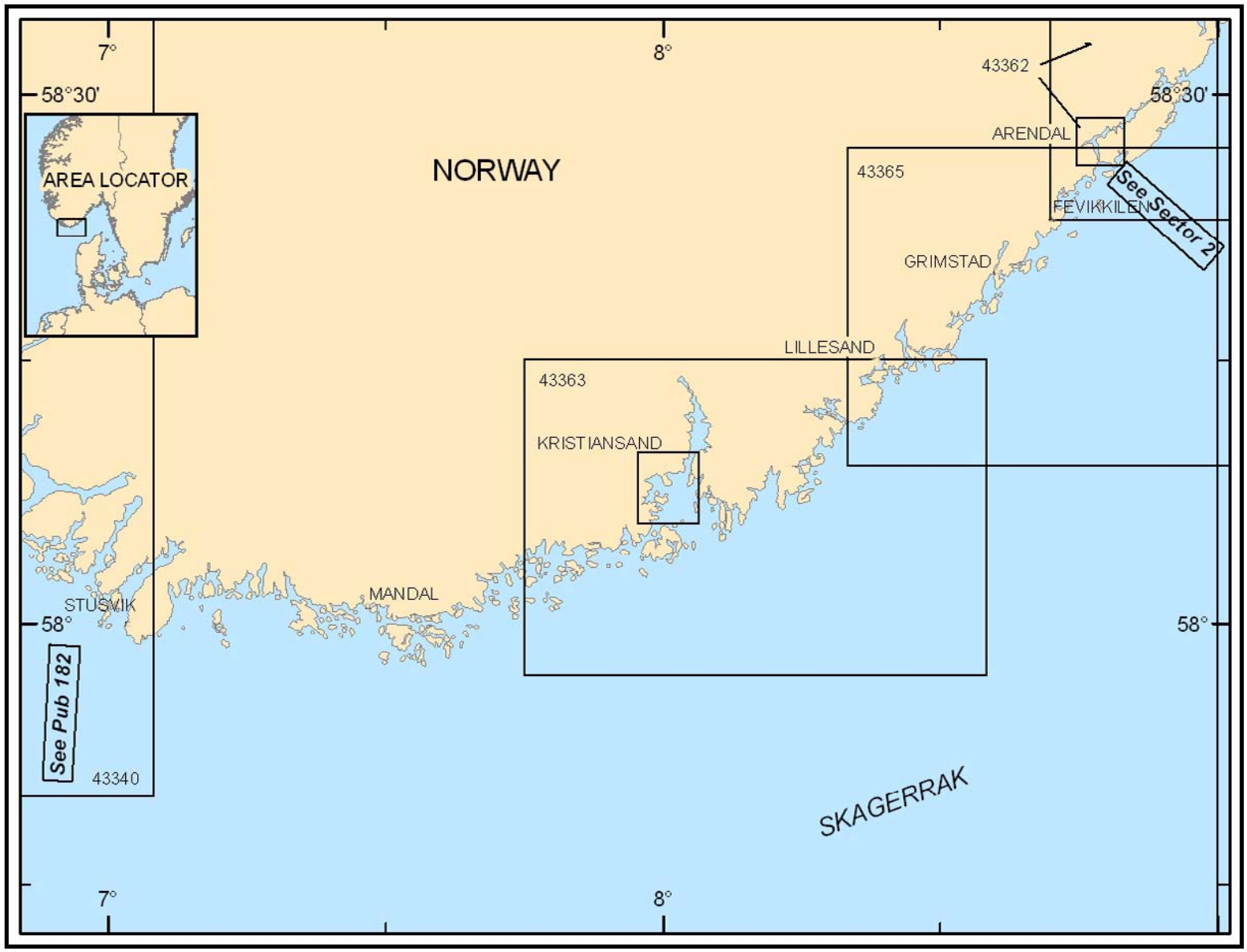
Navigation

LANBY	Large Automatic Navigation Buoy	SPM	Single Point Mooring
NAVSAT	Navigation Satellite	TSS	Traffic Separation Scheme
ODAS	Ocean Data Acquisition System	VTC	Vessel Traffic Center
SBM	Single Buoy Mooring	VTS	Vessel Traffic Service

Miscellaneous

COLREGS	Collision Regulations		
IALA	International Association of Lighthouse Authorities	No./Nos.	Number/Numbers
		PA	Position approximate
IHO	International Hydrographic Office	PD	Position doubtful
IMO	International Maritime Organization	Pub.	Publication
loa	length overall	St./Ste.	Saint/Sainte

Contents



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR 1 — CHART INFORMATION

SECTOR 1

NORWAY—SOUTHEAST COAST—LINDESNES TO ARENDAL

Plan.—This sector describes the SE coast of Norway between Lindesnes and the approaches to Arendal, about 60 miles NE. The descriptive sequence is SW to NE.

General Remarks

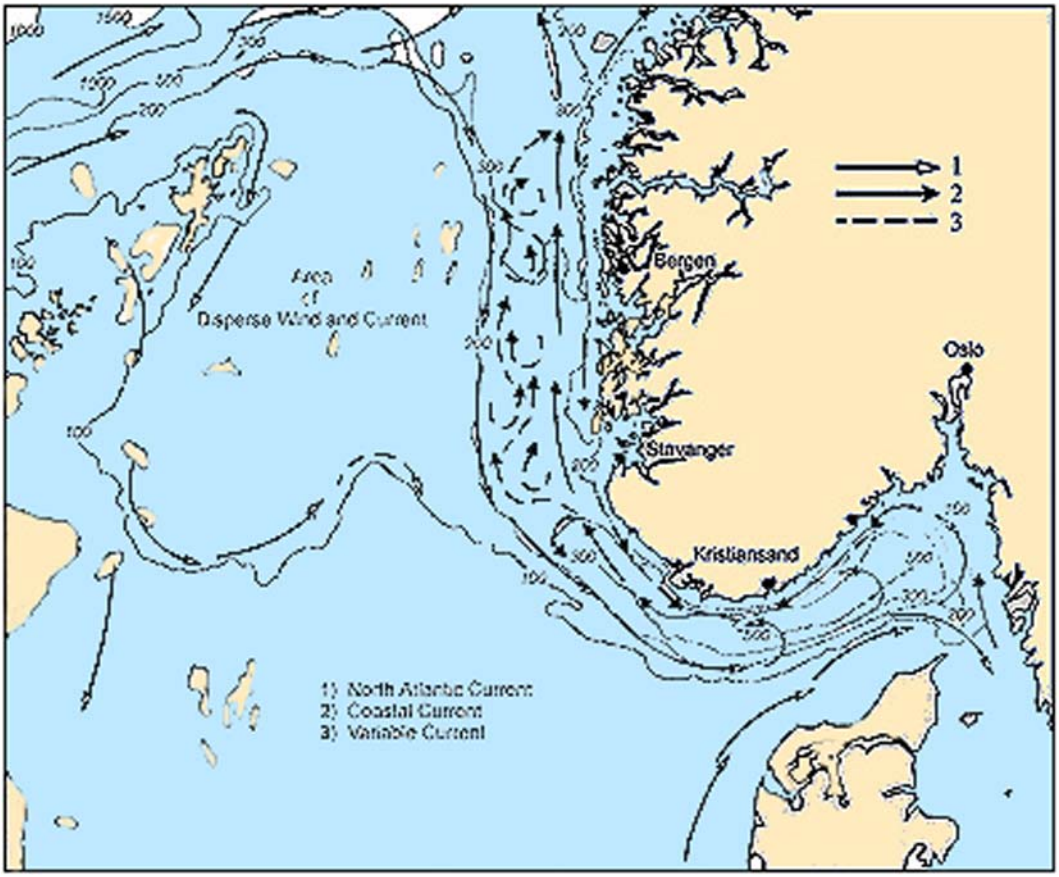
1.1 The SE coast of Norway, between Lindesnes and Arendal, has the same general features throughout. The coastline is quite irregular and much-indented; the hinterland is low-lying and generally featureless; and a multitude of off-lying dangers, some awash, extend up to about 5 miles seaward of the shore.

Natural landmarks and distinguishing features are few. Those more easily observed by vessels navigating off the coast include the peaks near Lindesnes (57°59'N., 7°03'E.); the light color of Songvar Island (58°01'N., 7°49'E.), the inland elev ridge of Kristiansands Hoye Land (58°20'N., 7°46'E.); Homborsundsfald (58°28'N., 8°31'E.), a steep plateau; and Grimstadsalen (58°21'N., 8°31'E.), a wooded peak.

An inner passage, available to small vessels with local knowledge, leads between the mainland coast and the archipelago of off-lying islands and islets, which is known as Skjaergarden. The passage is generally quite deep and well sheltered, but the channels are often narrow and rather open to the effects of the sea, particularly in the area E of Lindesnes.

Navigation off the Norwegian coast is difficult and requires great caution. During the summer months, the long daylight hours and short duration of darkness provide a visual advantage to navigation in the region. In winter however, when the nights are proportionately long, with the weather mostly stormy and cloudy. Snowstorms often obscure the landmarks.

The coast is high and bold, with the exception of Lindesnes, and it is difficult to pick out natural landmarks. The landmarks mentioned in this sector are mostly conspicuous only from a particular direction and distance. They are somewhat difficult to identify by vessels without local knowledge. With the exception of Udvare (57°59'N., 7°13'E.), the islands of Skjaergarden tend to blend in with the background.



Surface Currents off Norway

Ice.—Along the S coast of Norway, freezing starts earlier and with greater severity with increasing longitude. In January and February, ice normally forms in the inner leads, fjords, and several harbors located along the coastal stretch between Kristiansand (58°09'N., 8°00'E.) and the Swedish border (59°00'N., 11°05'E.). This creates regular problems for the fishing fleet and smaller vessels. Some harbors located to the E of Jomfruland (58°51'N., 9°36'E.), including Oslofjorden, become dependent on local icebreaker service for shipping. Except during a severe winter, harbors in the vicinity of Lindesnes (57°59'N., 7°03'E.) are seldom ice-bound. Most harbors lying W of Jomfruland are ice free.

In some winters, the shipping route leading along the S coast of Norway is hindered by drift ice. In addition, ice from the Kattegat drifts N with the current and adds to the problems of ice off the coasts of both Sweden and Norway. Such drift ice generally appears near the beginning of the year; however, it seldom appears before Christmas.

Ice is present in the entrance to Oslofjorden as late as April and is common in March. The dates are difficult to predict as it is dependent on the state of ice in the Baltic; however, this ice is seldom a hindrance to navigation after February.

The inner channel leading to Uddevalla (58°21'N.,11°55'E.) is normally covered with frozen ice during February and March.

The formation of ice is influenced by winds from the NE or E and its break-up and dispersal is caused by winds from the S or SW. Ice formation along the W coast of Sweden is unpredictable and treacherous due to the greater salinity of the Skagerrak compared with the low salinity of water flowing out of the Baltic Sea and local rivers.

The most critical months for ice formation are February and March as the sea is then at its coldest. Ice does not form during normal and mild winters along the W coast of Sweden. However, some ice will normally form in late January and persist until about mid-March. During severe winters ice may develop in late January and persist into late April. In the worst case the Kattegat and the E end of the Skagerrak may be frozen.

Tides—Currents.—Generally, an outflow of low salinity water travels from the Baltic Sea into the Skagerrak via the Kattegat. This outflow then mixes with water of higher salinity setting NE off the NW coast of Jutland (Denmark). The resulting N flow is mostly confined to the Swedish side of the Skagerrak until it turns W near the entrance to Oslofjorden. This flow then sets SW toward Kristiansand. The outflow of low salinity water is normally enhanced by fresh water from coastal rivers and fjords.

The center of this counterclockwise circulation lies about midway between the coasts of Jutland (Denmark) and Norway. The NE flow off Jutland attains a rate of 1 to 1.5 knots, the N flow off the coast of Sweden attains a rate of 1 knot, and the W flow attains a rate of 0.5 knot. The SW flow, at about 4 to 8 miles off the SE coast of Norway, attains a rate of 1 to 2 knots; however, at 20 to 30 miles from the shore the flow is weak and variable.

Pilotage.—The waters and ports described in this sector lie within the Oslofjorden Pilot Booking Center Area, which extends E from Egersund (58°27'N., 6°00'E.) to the Swedish border. All vessels must send an ETA and arrange pilotage services through Oslofjorden (Horten) Pilot Booking Center 24 hours prior to arrival. The practice of requesting pilots through the local stations has been discontinued. For further details, see Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

Regulations.—Speed is limited to 5 knots when navigating in waters less than 100m from the shore, boat harbors, anchored boats, etc.; and within 50m of public and private beaches. Public bathing places are marked by orange buoys (with an orange spherical topmark). Passing inside of these is prohibited.

Sea Safe Net (SSN) is a mandatory reporting system operated by the Norwegian Coastal Administration for all vessels entering Norwegian ports. For further details, see Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

It is reported that the Baltic Sea has been designated a Sulphur Emission Control Area and regulations concerning the sulphur content of fuel used by vessels apply. For further information, see MARPOL 73/78 Annex VI regulations.

Tankers.—Norwegian authorities recommend that tankers of 40,000 dwt and above, when navigating off the coast of Norway, should keep to seaward of a line joining the following positions:

1. Bearing 187°,distant 13 miles from Lindesnes Light (57°59'N., 7°03'E.).
2. Bearing 180°,distant 12 miles from Ryvingen Light (57°58'N., 7°29'E.).
3. Bearing 180°,distant 15 miles from Songvar Light (58°01'N., 7°48'E.).
4. Bearing 146°,distant 15 miles from Oksoy Light (58°05'N., 8°03'E.).
5. Bearing 156°,distant 12 miles from Svenner Light (58°58'N., 10°09'E.).
6. Bearing 135°, distant 2.5 miles from Faerder Light (59°02'N., 10°23'E.), at the S end of the Oslofjorden TSS.

Directions.—From a position located about 4 miles S of Lindesnes, the coastal route leads E and then ENE for 15 miles to a position S of Mandal (58°02'N., 7°28'E.). It passes outside the 200m curve and clear of all dangers. The route then continues E for 6 miles and ENE for 16 miles to a position SSE of Kristiansand. It passes inside the main fishing ground.

An inner passage, available to coasters and small craft, leads between the mainland coast and the archipelago of off-lying islands and islets. However, local knowledge and local large-scale charts are required for navigation along this route. Entry into the inner passage is restricted for foreign vessels.

Caution.—In heavy gales, the sea often breaks over ground with depths of less than 40m, especially if the depth is greater on the side from where the swell comes.

Dangers off this coast may often be detected by noticing a number of sea birds, especially gulls, near the surface of the water, as they gather in the vicinity of shoals to catch small fish.

The seaway in and around Kristiansandsfjorden is the site of both several overlapping firing areas and a restricted area, in which navigation is controlled by regulation.

Certain areas within the Sorlandet Maritime Defense District are prohibited to navigation. These areas generally lie within 50m of the shore around Kristiansand (58°09'N., 8°00'E.), and

Mandal (58°02'N., 7°28'E.). However, details of the limits should be obtained locally. Photography is also prohibited. For further details, see Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

Sea waves are generated locally by the wind and can vary in direction. Some of the roughest seas are experienced when a vigorous secondary depression develops in the Skagerrak or W of the area. Strong to gale force winds generated between SW and NW are not unusual. In the many inlets and fjords, the seas are generally less than they are over open water. Although, where there is a funneling of the wind, the seas may be higher than expected.

Fishing is a year-round industrial activity with seasonal concentrations in various localities; most fishing is in coastal and fjord waters, but there has been a great extension seaward in recent years. The seasonal aspect is marked mostly in coastal waters where there may be large gatherings of vessels with fishing gear. Other vessels should keep a safe distance when transiting through these areas and avoid the congested fishing harbors.

During the period of drift net fishing for mackerel (May to July) all vessels, except the tankers stated above, are requested to keep within 4 miles of the coast in the area E of Lindesnes as the main fishing ground lies to seaward of this limit.

Brisling (i.e., sprat or small herring) fishing is active closer inshore and, particularly, within the many inlets indenting the shoreline.

Mackerel fishing takes place in Skagerrak from the end of April until late summer by drift net, purse net, and trolling. The greatest concentration of drift net vessels will be found in the area from Lillesand to Lista. Drift nets may be up to 2 miles long. They are set at sundown and hauled early in the morning, they are marked by floats, and the end of the net is marked by buoys with flags and lights. Drift net vessels often illuminate the net with a searchlight.

Purse nets, marked by floats, are laid from the starboard side of the vessel, which proceeds in a circle and may occupy a considerable area; there may also be a boat with a towline up to 90m long from the vessel. A purse net vessel exhibits, in addition to the lights prescribed by the International Regulations for Preventing Collisions at Sea, two yellow lights disposed vertically and flashing alternately.

Sprat fishing occurs from early June and throughout summer and autumn in the fjords of S Norway; Oslofjorden is considered a good area. Fishing is carried out mainly by purse nets and partly by land nets. The catch from a purse net is released into a tow net, which is then brought inshore and transferred to a land net.

Coalfish and tunny fishing take place off the coast from May until autumn. Purse nets are used and may extend up to 146m.

Trawling is carried out mostly outside the fishery limits, but shrimp and float trawlers may be met inside them. When working in pairs at night, each trawler uses a searchlight trained in the direction of the other vessel.

Off-lying Dangers

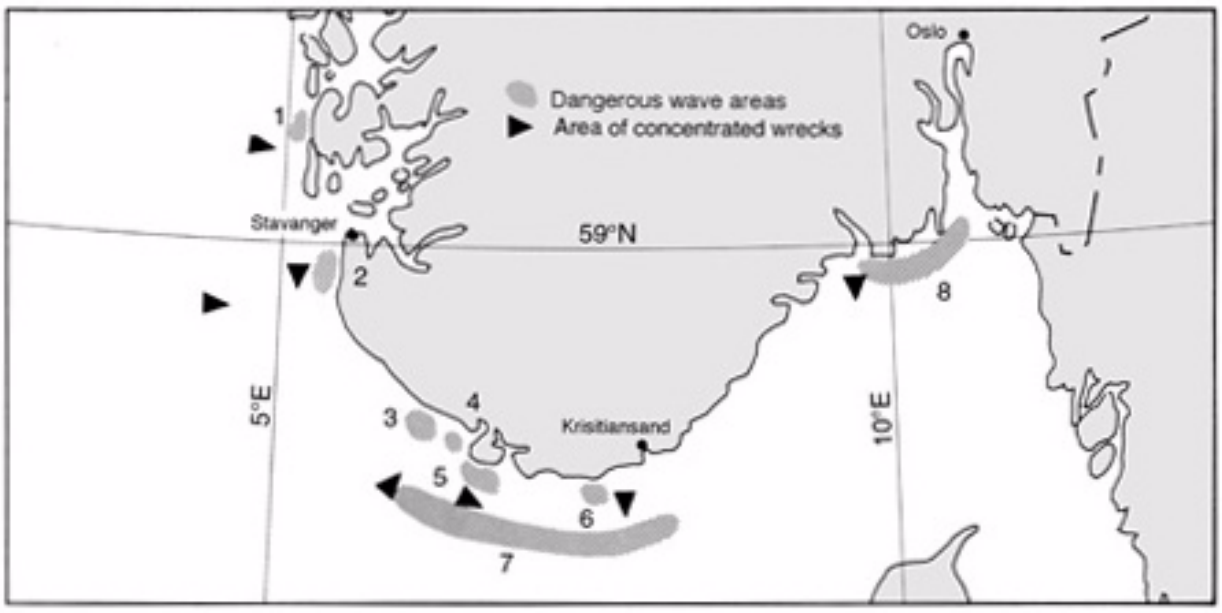
1.2 Along the S coast of Norway, there are several sections within which unusually rough seas often prevail. Extreme sea conditions and breaking surf have been observed, often in connection with the currents, in the vicinity of these areas These sections, known as Dangerous Wave Areas, may be seen on the graphic titled **Dangerous Wave Areas off the Norwegian Coast**and are described below, as follows:

1. **Area 1.—**Sletta (59°29'N., 5°10'E.) lies about 6 miles NW of Haugesund. In this area the depths vary greatly from shallow shoals to 250m. Very confused seas occur when the waves are from W to NW.
2. **Area 2.—**Skotamedgrunnen (58°48'N., 5°26'E.) is a dangerous area extending about 2 miles around a shoal in a SW-NW direction. The depths vary from 40m close W of the shoal to 16m E of it. Waves from SW to NW create heavy seas and breakers have been observed in this area.
3. **Area 3.—**Siragrunnen (58°16'N., 6°20'E.) lies off the channel to Ana-Sira, where the depths vary from 10 to 100m. Current conditions in the area are very variable. Farther offshore, the coastal current flows NE; however, between the shore and the coastal current, there is a counter-current flow.

The runoff at the entrance to Ana-Sira discharges at a maximum rate of 3 knots. This area should be avoided in bad weather. The SE wind over the variable S to NW current creates rough seas.

4. **Area 4.—**Listafjorden (58°10'N., 6°35'E.) lies at the entrance to a fjord gap, 1 mile wide, between Hidra and Varneset. Rough seas and swells break steeply from depths of about 300m onto the shore.
5. **Area 5.—**(58°03'N., 6°40'E.). The seabed slopes steeply along the 7 miles of coast at Lista, between Steinodden and Rauna. This causes wave refraction. Additionally, the current conditions vary with formations of eddies. The confused sea can be rough. Heavy breakers have also been observed in this area.
6. **Area 6.—**(57°58'N., 7°30'E.). The coastal current around Ryvingen Light, off Mandal, normally runs W. Winds from SW to W, interact with the current and generate big seas and breakers in the area.
7. **Area 7.—** (57°50'N., 6°00'E. to 57°40'N., 8°30'E.). This is a large area lying in the NW part of the Skagerrak, off the S coast of Norway. Depths are mainly less than 100m with the exception of Norskerenna. The W coastal current dominates the current pattern. With waves from SW, several refraction centers are created off the coast (over Norskerenna) and, in addition, refractions are caused by the steep seabed near the shore. Interaction between waves and current leads to breakers.
8. **Area 8.—**(59°02'N., 10°32'E. to 58°57'N., 9°45'E.). The area extends from Fider (Faerder) to Hvasser/Tjome, past Svenner to Tvistein Light. The waters are 50 to 100m deep, interspersed by a number of shoals. The W current in the area is independent of the tide and has a rate of 1 to 1.5 knots. There are several refraction centers in this area with winds from SW to SE. Winds from SE to SW create the roughest seas and heavy breakers in the E part of the area. The sea is described as rough and recoiling from all directions. Waves from SW break heavily in the W part of the area.

Pilotage is not compulsory for the coastal passage but can be arranged, if needed, through Sogndal or Kristiansand Pilot Stations.



Dangerous Wave Areas off the Norwegian Coast

Lindesnes to Kristiansandsfjorden

1.3 The coastline between Lindesnes and Kristiansandsfjorden, about 30 miles ENE, is irregular and much indented by an uninterrupted series of coves, small bays, and long, narrow, winding inlets.

Inland, the terrain consists of a succession of low, rocky hills and rolling plains, somewhat forested but barren for the most part, which continue in from the sea about 10 miles before rising steeply to interior highlands and mountains.

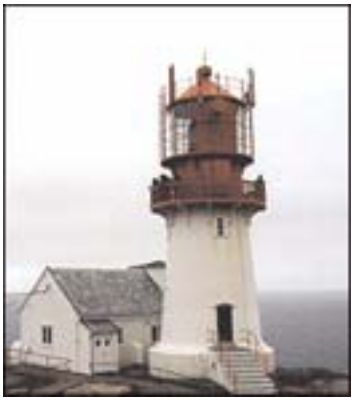
The coast is fronted by many forested islands, barren islets, and scattered rocks which generally extend up to 3 to 5 miles seaward. In appearance, most of these islands and islets tend to blend in with their background and produce a combined effect which offers few distinguishing features.

The 200m curve, in general, lies about 1 to 3 miles S of the off-lying dangers, except between Ryvingen (57°58'N., 7°30'E.) and Ballastskjaerene (57°58'N., 7°41'E.), where it is located less than 1 mile seaward.

The coast between Lindesnes and Tanes, 19 miles E, is considered to be one of the most exposed stretches of the Norwegian coast and also one of the most hazardous to navigation.

1.4 **Lindesnes** (57°59'N., 7°03'E.), the southernmost extremity of the Norwegian mainland, forms an important landfall point for vessels entering the Skagerrak from N or W. It consists of a bluff reddish-brown rocky headland, which rises abruptly to a height of 40m. This headland is steep-to and the depths give vessels little indication of their distance from the land.

A light is shown from a prominent tower, 16m high, standing on the headland.



Lindesnes Light

Neskletten (57°58'N., 7°02'E.), a shoal bank with a least depth of 22m, extends up to about 1.3 miles S of Lindesnes Light and the sea sometimes breaks on it.

The land in the vicinity of Lindesnes is bold, rugged, and moderately high. However, it is difficult to differentiate when seen from seaward because the natural landmarks do not particularly stand out and tend to merge with one another. On closer approach, the light structure on the headland will become conspicuous. Inland, the peninsula located behind Lindesnes rises to several prominent peaks. These peaks are generally covered with snow and are visible during clear weather, in spring, from a distance of 30 to 40 miles.

The more prominent peaks include Neskongane (58°00'N., 7°05'E.), with several knolls rising to heights of about 90m; Skipmannsheia, 153m high; and Presthusveten (58°03'N., 7°07'E.), 185m high.

Lista Light, equipped with a racon, is shown from a prominent tower, 34m high, standing 17 miles WNW of Lindesnes Light.

For a description of the waters lying W of Lindesnes Light, see Pub. 182, Sailing Directions (Enroute) North and West Coasts of Norway.

1.5 **Udvare** (57°59'N., 7°13'E.), a small rocky island, lies about 5 miles E of Lindesnes Light and is reported to be radar conspicuous. A light is shown from a building standing on the S end of this island. Udvare lies at the S end of a group of islands, islets, and rocks. Vare, located 1.5 miles N of Udvare, is the largest island of this group and, together with Udvare, rises to the same height as the mainland. The group resembles a lofty promontory until approached close enough for the intervening channels to be distinguished.

Kletten (57°57'N., 7°12'E.), with a least depth of 8m, is the southernmost of a chain of shoals, which extends up to about 2 miles S of Udvare. Gjeslingane, consisting of two rocks awash, lies 0.8 mile N of Kletten and is marked on the W side by a perch.

Langebaene (57°59'N., 7°09'E.), lying between Lindesnes and Udvare, consists of numerous dangers and several rocks, which are grouped around a small central drying area.

Tvisteinen, a reef, lies 3 miles E of Udvare Light and partly dries. It is the southernmost danger in this vicinity. During S or SW winds, the sea breaks on ground with depths of 18 to 22m lying near the outer edge of this reef.

Ramslandsvagen (58°02'N., 7°07'E.), a small inlet, is entered 3 miles NNE of Lindesnes. It provides anchorage, in a depth of 15m, sand and clay, close to the W shore and 0.5mile within the entrance. The approach to the inlet is encumbered by reefs and islets, which form a natural breakwater near the entrance. Local knowledge is required. During strong NW winds, a choppy sea forms in the inlet and adjacent waters.

Several other small fjords and bays in this area provide shelter to coasters and small craft; however, the approaches are intricate and local knowledge is necessary.

Hille (58°00'N., 7°22'E.), a relatively large island, lies 4.5 miles ENE of Udvare and rises to a height of 98m near its center. A bay on the N side of this island provides anchorage, in depths of 20 to 34m.

Conspicuous landmarks along this part of the coast include Hovenuten (58°05'N., 7°17'E.), which rises to a height of 209m, and Skeggestadheia, 1.5 miles SSE, which rises to a height of 202m.

1.6 **Mannefjorden** (57°59'N., 7°28'E.), located 13 miles E of Lindesnes Light, is a deep and somewhat narrow sea area, which provides relatively clear access to the Mandalselva River and the community of Mandal.

Ryvingen (57°58'N., 7°30'E.), a conspicuous island, lies at the E side of the entrance to Mannefjorden. A light, equipped with a racon, is shown from a prominent tower, 22m high, standing on the southwesternmost peak of this island. A beacon is situated close ENE of the light.

Hjelmen and Eigelandskjaer, two small islets, lie close N of Ryvingen, and are conspicuous by reason of their dark brown color. Similarly a strip of sandy beach lying at the head of the fjord and W of the river entrance is visible for a considerable distance because of its bright yellow color.

Two hills, Kalven and Kua, stand in the NE corner of the fjord and are about 120m high. These hills are conspicuous because of their haystack form, but are obscured to vessels proceeding from Lindesnes by the high peaks rising on the island of Hille.

Ryvingen Light

Anchorage.—Large vessels may anchor, in depths of 9 to 11m, about 0.3 mile NNW of Hattholmane Light (58°00'N., 7°27'E.). A rock lies about 0.2 mile NNE of this anchorage and should be avoided. It has a least depth of 6m and is marked by a buoy.

Small vessels, with local knowledge, can anchor, in a depth of 12m, sand, about 0.7 mile NW of Hattholmane Light. A rock, with a least depth of 4.3m, lies close E of this anchorage.

Directions.—Several channels lead from seaward through Mannefjorden and its adjacent waters to the inner anchorages and the facilities at Mandal. The principal approach route, used by deep-draft vessels, leads N through Mannefjorden. It passes W of Ryvingen and E of Hattholmane (58°00'N., 7°27'E.), an island marked by a light on its NE side.

Caution.—The Mandalselva River has a continuous outflow which creates eddies W of the mouth.

A submarine cable extends N and NNE for 1.3 miles between a cove located on the SE side of Ryvingen and an inlet on the SW side of Skjernoy. Another submarine cable extends between Hattholmen and the mainland. These cables may best be seen on the chart.

1.7 Mandal (58°02'N., 7°28'E.) (World Port Index No. 23530) is the southernmost town in Norway. It stands at the foot of a low hill on the W bank of the entrance to the Mandalselva River. This river flows into the head of Mannefjorden. The main commercial facilities of the port are situated at Kleven and Gismeroya, which are located close E of the town and connected by a bridge.

Tides—Currents.—Water levels fluctuate primarily due to meteorological conditions since tidal action is generally very slight or lacking altogether. Currents within the river attain a velocity of several knots but become insignificant outside. Ice is seldom a hindrance.

Depths—Limitations.—The approach channel leading to Gismeroya has a least depth of 11m. The entrance channel leading into the river is dredged to a depth of 4.5m over a width of only 20m. Twenty berths, up to 200m long, front the river banks and have depths of 2 to 5.4m alongside. A bridge, with a vertical clearance of 3.5m, spans the river, 0.6 mile above the mouth.

Gismeroya provides three berths. The main berth is 97m long and has depths of 10.4m to 15.9m alongside. Vessels up to 20,000 grt, 150m in length, and 9m draft can be handled.

An oil-fuelling installation is situated at Homsvik (58°00.4'N., 7°30.0'E.). It has depths of 13 to 19m alongside and can accommodate tankers up to 50,000 dwt and 10m draft.

Pilotage.—Pilotage is compulsory in the harbor for vessels over 100 grt. Harbor pilots usually board SE of Oksoy (58°03'N., 8°07'E.), for vessels approaching from E, and SW of Sogndalsstrana (58°18'N., 6°14'E.), for vessels approaching from W. Vessels should request pilotage services 24 hours in advance through Oslofjorden (also see paragraph 1.1).

Caution.—In SE strong winds, entry into the river may be impossible.

1.8 The shore between Mannefjorden and Tanes, a point located 6 miles E, is quite regular with the exception of Hartmarkfjorden, which indents the coast for a distance of about 2 miles.

Oddknuppen (57°58'N., 7°34'E.), marked by a light, is the outermost islet of a group of rocks and islets which extend up to about 3 miles seaward.

Gasekjaerene, lying about 2.5 miles ENE of Oddknuppen Light, is a group of rocks, some awash.

Tanes (58°01'N., 7°40'E.) is marked by a beacon, 3m high. This point is low, but it is backed by Eidsveten, a conspicuous hill, which rises to a height of 130m about 1.5 miles NNW.

The coast between Tanes and Kristiansandsfjorden, about 9 miles ENE, is irregular and indented by an uninterrupted series of deep, and often quite narrow, inlets.

The shore is fronted by an area containing numerous low islands, islets, and scattered rocks. These dangers are steep-to and soundings are of little use when approaching from seaward.

Ballastskjaera Light (57°58'N., 7°41'E.) is shown from a framework tower standing on Vestre Ballastskjaer, the southwesternmost rock, dark and awash, of a group of dangers lying centered about 2.3 miles SSE of Tanes. Udvar, the southernmost island of a chain of islands and islets fronting the mainland, lies 2.6 miles NE of this light.

Songvar, fringed by islets and rocks, lies 5 miles NE of Ballastskjaera Light. This island is light colored and has patches of brown.

Songvar Light

1.9 Songvar Light (58°01'N., 7°49'E.) is shown from a building, 10m high, standing on the SE end of Hellersoy, an island lying 0.2 mile S of Songvar.

Vibaen, a rocky shoal, lies about 1 mile SW of Songvar Light. It has a least depth of 15m and is the outermost danger in this vicinity.

Songvarfjorden (58°02'N., 7°48'E.) is a passage leading between the dangers extending S from the mainland and those fronting the N side of Sngvar. It is about 0.4 mile wide and has depths of 50 to 130m. Varholmen, an islet, lies on the N side of this passage, about 1 mile N of the N end of Songvar, and is marked by a light.

An inner passage, recommended only for vessels with local knowledge, leads E from Tanes. It passes N of Udvar and through Songvarfjorden.

Numerous channels entered from seaward lead through the off-lying dangers to the many inlets indenting this stretch of coast. In addition, channels branching from the inner passage lead to several small harbors, anchorages, and marinas. However, local knowledge and local large-scale charts are required for navigation in this area.

The main anchorages and harbors lying within this archipelago include the following:

1. Tredge (58°00'N., 7°34'E.).
2. Hollen (58°05'N., 7°49'E.).
3. Ny Hellesund (58°03'N., 7°51'E.).
4. Nodenest (58°04'N., 7°52'E.).
5. Sandoyhavn (57°58'N., 7°33'E.).
6. Odoyfjorden (57°59'N., 7°35'E.).

Kristiansandsfjorden

1.10 Kristiansandsfjorden (58°06'N., 8°02'E.), located 33 miles ENE of Lindesnes, is the first major fjord or inlet to indent the S coast of Norway. It provides access to the extensive port of Kristiansand. The terrain surrounding this fjord is relatively level and consists, in general, of bare, dark gray stone slopes alternating with forested hillocks. The fjord, which is an arm of the sea, extends N for about 5 miles and is 1.7 miles wide. It leads into Topdalsfjorden which then continues N for about 6 miles. The inlet is deep throughout and, with depths over 200m in its

middle part, is able to accommodate vessels with the deepest draft.

In general, as is common along this coast, Kristiansandsfjorden is difficult to identify from seaward because the offlying islands and islets tend to merge with the forested hills of the mainland background.

Kristiansands Hoye Land (58°19'N., 7°45'E.), situated about 13 miles NNW of Kristiansand, is an uncharted mountain ridge which rises to two unequal humps. This ridge slopes gradually to the E and, from the higher of the two humps, falls off abruptly to the W. It is usually one of the first landmarks to be observed when approaching the coast. This ridge is often distinguishable from the surrounding mountain features due to its distinctive bluish color. It is reported, in clear weather, to be visible from a distance of about 30 miles.

Den Omvedte Bat, a hill which resembles a capsized boat, rises about 2.5 miles NNW of Kristiansand and is very conspicuous from seaward.

A smelting works situated at Fiska, 1.2 miles SW of Kristiansand, emits smoke from a chimney, which is often visible to seaward well before any other landmarks in the area can be identified.

Ytre Flekkeroy (58°04'N., 8°00'E.), a large island, obstructs the W side of the entrance to the fjord. Numerous islets and rocks extend up to about 1.5 miles seaward from the S and SE sides of this island and may best be seen on the chart.

Bergenesodden Light (58°03.5'N., 7°58.6'E.) is shown from a framework tower standing on the SW end of Ytre Flekkeroy. A conspicuous radio mast is situated about 0.4 mile ENE of this light.

Svensheia (58°05'N., 7°55'E.), a prominent hill, is situated on the mainland at the W side of the entrance to the fjord. It is 114m high and rises 2.5 miles NW of Bergenesodden Light.

Blaestholmen Light (58°03.4'N., 8°00.6'E.) is shown from a tripod structure standing on an islet lying 1 mile E of Bergenesodden Light.

Hanegalsbaen, a detached shoal patch, lies about 2.2 miles SW of Bergenesodden Light. It has a least depth of 6m and is marked by a buoy. This shoal forms the outermost danger in this vicinity.

1.11 Oksoy (58°04'N., 8°03'E.), a small and low island, lies near the center of the entrance to the fjord, 1.7 miles ENE of Blaestholmen Light. A shoal bank, with depths of less than 10m, extends about 1 mile S and SSW from the S end of this island. A spit, with depths of less than 5m, extends about 0.3 mile N from the N end of this island.

A light, equipped with a racon, is shown from a prominent tower, 36m high, standing on the S part of the island.

Kinn Light (58°05.7'N., 8°02.3'E.) is shown from a structure standing on the N end of a small island lying off the NE side of Ytre Flekkeroy, 1.6 miles NNW of Oksoy Light.

Ostre Randoy (58°06'N., 8°07'E.), a low island, lies in the center of a group of islands, islets, and rocks which obstructs the E side of the entrance to the ford and may best be seen on the chart.

Odderoya Light (58°08'N., 8°00'E.), situated 2.3 miles NNW of Kinn Light, is shown from a tower structure, 6m high, standing on the foreshore at the SW side of an island of the same name. This island rises to a height of 90m. The former conspicuous lighthouse building is situated close behind the light structure.

Oksoy Light

Odderoya Light

Gronningen (58°05'N., 8°05'E.), an islet, lies on a reef at the SW end of the group, 1.3 miles ENE of Oksoy Light. A light is shown from a tower surmounting a building, 14m high, standing on the N extremity of this islet.

Skogrunnen, a rocky shoal with a least depth of 8.5m, lies at the S end of a bank, about 1.5 miles ESE of Gronningen Light, and forms the outermost danger in this vicinity.

Gronningen Light

1.12 **Vestregapet** (58°04'N., 7°57'E.), the SW and secondary approach from seaward into Kristiansandsfjorden, leads between the SW side of Ytre Flekkeroy and the numerous islets and rocks lying S of the mainland coast. Flekkeroygapet, the continuation of this passage, is a narrow channel lying between the NW side of Ytre Flekkeroy and the irregularly-formed mainland peninsula of Indre Flekkeroy. The route then joins the SE approach through Kristiansandsfjorden.

Oksoygap (58°05'N., 8°05'E.), the SE and main approach from seaward into Kristiansandsfjorden, leads between the dangers fronting the E side of Oksoy and similar dangers fronting the W side of Gronningen. This passage, which has a least width of about 0.6 mile, is deep. The fairway, which passes NE of Kinn Light, is indicated by the white sector of Odderoya Light.

Foreign commercial vessels must enter Kristiansandsfjorden by proceeding through Oksoygap.

Tides—Currents.—A prevailing W setting coastal current enters Kristiansandsfjorden through the SE approach, passes N of Ytre Flekkeroy and exits through the SW approach. Concurrently, fresh water discharged into Tovdalsfjorden and the upper reaches of Kristiansandsfjorden first sets S then, deflected by its encounter with the coastal current, similarly exits through the SW approach. Currents are therefore gen-erally stronger in the SW approach than in the SE approach and may reach a velocity of 3 knots, particularly during periods of fresh water run-off caused by rain or melting snow.

Pilotage.—Pilotage is compulsory for all foreign commercial vessels during transit of the waters within the restricted area fronting Kristiansandsfjorden. Such vessels may not navigate in any channel other than the SE approach passage leading to Kristiansand or Tovdalsfjorden.

Vessels should send an ETA and arrange pilotage services through Oslofjorden 24 hours in advance (see paragraph 1.1). Vessels should then send an ETA to the port 2 hours prior to arrival, preferably using Safe Sea Net (SSN) or via the Horten Pilot Booking Center. Pilots can be contacted by VHF channel 16 and 12 and board about 1.5 miles SE of Oksoy Light (58°04'N., 8°03'E.).

Pilots can be contacted, as follows:

1. E-mail: post@kristiansund-havn.no
2. Internet: http://www.kristiansand-havn.no

The station at Kristiansand also provides pilots for Farsund, Agnesfost, Lillesand, Grimstad, Risor, and Arendal.

Regulations.—A restricted area, in which navigation is controlled, fronts Kristiansandsfjorden and the adjacent waters. The seaward limit of the area is formed by a line joining Arosveten (58°04'N., 7°50'E.), Hellersoy (58°01'N., 7°49'E.), Lille Svarten (58°03'N., 8°01'E.), Meholmskjaer (58°06'N., 8°12'E.), Langbaen (58°07'N., 8°15'E.), and Krygholmen (58°07'N., 8°14'E.). Foreign commercial vessels may only enter this area via Oksoygap and with an authorized pilot on board.

Caution.—A disused explosives dumping area, the limits of which may best be seen on the chart, lies centered 1 mile NW of Gronningen Light.

An explosives dumping area, the limits of which may best be seen on the chart, lies centered 8 miles S of Oksoy Light.

Several submarine cables, which may best be seen on the chart, extend the length of the fjord and lead seaward through Oksoygap.

Kristiansand (58°09'N., 8°00'E.)

World Port Index No. 23550

1.13 Kristiansand stands on a sandy plain about 5 miles inside Kristiansandsfjorden. It is located on the W side of the mouth of the Otra River. The port area is divided into two sections by the forested island of Odderoya, which lies S of the town. Vesterhavn, the W section, along with its SW extension Fiskabukta, is commonly used by commercial shipping. This area is considered to be one of the finest natural harbors in Norway because of its shelter, room, convenient depths, and easy access. There is sufficient space to accommodate a large number of vessels in this section. Several shipyards and industrial plants stand along the mainland shore of Vesterhavn and Fiskabukta.

Austerhavn, the E section, is open to the SE and mostly encumbered by a shallow bank. It has several marinas and is used mostly by only small craft. A naval base is situated at Marvika, 1 mile E of the town.

Kristiansand

Ice.—Ice is seldom a concern for shipping. In severe winters, from the middle of February to the beginning of March, it may become a hindrance, but never so great that icebreakers cannot keep the harbor open and clear.

Tides—Currents.—Tides in the harbor are mostly negligible but a rise of 0.3m is referenced for HW springs. During storms, with strong S or W winds, the water level may rise by as much as 0.6m. With strong N or E winds, the water level may decrease by the same amount.

Water flowing from the Otra River empties into Austerhavn and often produces a noticeable set which flows toward the small islands lying on the NE side of Odderoya.

Depths—Limitations.—The principal commercial berths, along with alongside depths, are, as follows.

1. Berth No. 1—110m long, with a depth of 6.9m.
2. Berth No. 1A/1B—300m long, with a depth of 7.9m.
3. Smiths Quay—200m long, with a depth of 7.9m.
4. KMV Quay 2A—110m long, with a depth of 7.9m.

5. KMV Quay 2B—170m long, with a depth of 7.9m.
6. Coastal Terminal—130m long, with depths of 4.8 to 8.8m.
7. Moes Quay—120m long, with a depth of 6.9m.
8. Caledonien Quay—185m long, with a depth of 8.8m.
9. Caledonien Ro-ro Quay—20m long, with a depth of 6.3m.
10. Odderoy Quay—318m long, with a depth of 11m.
11. Petroleym Quay—64m long, with a depth of 11.8m.
12. Lagmanns Quay—268m long, with a depth of 8.8m.
13. Lagmanns Ro-ro Quay—26m long, with a depth of 8.8m.
14. Agder Quay is 112m long, with a depth of 8.8m.

Several specialized berths, used by small vessels, are situated along the lower banks of the Otra River. The bar at the mouth of this river has a depth of 3.7m. A bridge, with a vertical clearance of only 4m, spans the river 0.5 mile above its mouth.

The port has facilities for general cargo, ro-ro, cruise, container, ferry, tanker, bulk, and fishing vessels. In addition, there are several shipyards, lay-up anchorages, and facilities for servicing oil and gas rigs.

The port has several dry docks. The largest is 210m long and 28m wide, with a depth of 7.6m on the sill. It can handle vessels up to 40,000 dwt.

Vessels up to 25,000 dwt and 10m draft can be accommodated alongside. Vessels of any size may enter the harbor and anchor.

Aspect.—Hogfjell, a prominent hill, rises at the E side of Yttre Flekkeroy, about 0.9 mile NNW of Blaestholmen Light. It is 52m high and surmounted by a radio mast.

A cathedral, with a prominent spire, stands in the middle of the town. A conspicuous radio mast, with satellite dishes, is situated about 0.7 mile SSE of the cathedral, near the middle of Odderoya.

Pilotage.—See Pilotage under Kristiansandfjorden in paragraph 1.1 and paragraph 1.12.

Signals.—The port may be contacted by e-mail, as follows:

Port of Kristiansand
http://www.kristiansand-havn.no

Anchorage.—Vesterhavn and Fiskabukta provide sheltered anchorage for large vessels, in depths of 15 to 40m, mud, sand, and scattered patches of rock.

Caution.—A measured distance of 1,852m, which may best be seen on the chart, is situated at the E side of the fjord, 1 mile N of Kinn Light, and is marked by beacons. It is reported that these beacons are in poor condition and not readily visible.

1.14 Tovdalsfjorden (58°07'N., 8°03'E.), the continuance of Kristiansandsfjorden, is generally quite deep throughout but the entrance is somewhat obstructed by several off-lying rocks.

A suspension bridge, with a vertical clearance of 27m, spans the fairway about 1.2 miles within the entrance. A submarine pipeline, which may best be seen on the chart, crosses the inlet close below the bridge.

Gleodden (58°08.8'N., 8°02.3'E.), marked by a light, is the W entrance point of this inlet.

Marvika, a cove located close N of Gleodden, is the site of a small naval base. Navigation and anchorage are prohibited within the vicinity of this cove.

Alefjaer (58°14'N., 8°02'E.) is located at the head of Alefjaerfjorden, a continuation of Tovdalsfjorden. This small harbor has a berth, 35m long, with depths of 3.9 to 4.4m alongside. It is used by small vessels to load timber.

Anchorage.—Tovdalsfjorden provides good anchorage throughout, in depths of 13 to 43m. Kongsgardbukta, a small bay, lies 0.5 mile N of Gleodden, at the W side of the fjord, and forms a good lay up area. Anchorage is available, in depths of 23 to 27m, mud, and there are a number of mooring buoys.

Kristiansandsfjorden to Arendal

1.15 The coast between Kristiansandsfjorden and the approaches to Arendal, about 27 miles NE, is irregular with an uninterrupted series of coves, small bays, and inlets of a generally moderate size throughout. Inland, the terrain continues as a succession of low, rocky hills and rolling plains which become more forested the greater the distance from the open sea. The land has a general light gray color as far as Homborsund, 15 miles NE. It then has a dark gray shade, except for a stretch extending 5 miles NE of Grimstad (58°20'N., 8°36'E.), which has an easily identifiable and prominent reddish-brown color. Offshore, the coast continues to be fronted by many islands, numerous islets, and a multitude of scattered rocks which are generally barren. In appearance, they all tend to merge with the mainland background which is largely void of any distinguishing features. In places, breakers on the coastal bank have been observed up to 1 mile seaward of the outer dangers. The 200m curve parallels the coast and lies between 2 to 4 miles seaward of the dangers, except near Kvasefjorden, where it closes to a distance of about 1 mile.

Directions.—From a position located about 5 miles SSE of Oksoy Light (58°04'N., 8°03'E.), off the entrance to Kristiansandfjorden, the coastal route leads ENE for 10 miles and then 23 miles NE to a position 4 miles ESE of Torungen Light (58°24'N., 8°48'E.). It passes outside the 200m curve and clear of all dangers.

An inner passage, available to coasters and small craft, leads between the mainland coast and the archipelago of off-lying islands and islets. However, local knowledge and local large-scale charts are required for navigation along this route. Entry into the inner passage is restricted for foreign vessels (see paragraph 1.1).

1.16 Kvasefjorden (58°07'N., 8°12'E.) is located 4.5 miles NE of Oksoy Light (58°04'N., 8°03'E.) and extends N for about 3.5 miles. This fjord is quite deep throughout but the entrance is largely encumbered by many off-lying dangers which may best be seen on the chart.

Torsoy Light (58°06'N., 8°09'E.) is shown from a structure standing on the E extremity of Torsoya, an island lying at the W side of the fjord.

Ytre Hausane (58°06'N., 8°11'E.), with a least depth of 4.5m, lies about 1.8 miles SE of Torsoy Light and is marked by a lighted buoy. Sorenshausen, a detached shoal patch, lies about 0.7 mile ENE of Ytre Hausane and has a depth of 15m. These detached rocky shoals form the outermost dangers lying off the entrance to the fjord.

Anchorage.—Large vessels can anchor near the head of Kvarenesfjorden, a bay lying on the W side of Kvasefjorden, about 1.5 miles within the entrance. Large vessels may also anchor in Dypingen, a narrow bay lying on the E side of the fjord. An uncharted hill stands on the E side of Dypingen. It is distinctive from the SW because of the steep slope on its W side.

Caution.—Several submarine power cables, which may best be seen on the chart, extend through the middle of Kvasefjorden and then project seaward across the Skagerrak. These cables may cause magnetic anomalies.

1.17 Natviktangen Light (58°08'N., 8°15'E.) is shown from a structure standing on a small mainland promontory, 4 miles NE of Torsoy Light. This promontory is fronted by numerous dangers which may best be seen on the chart.

Bleikgrunnen (58°05'N., 8°15'E.), a detached rocky shoal, lies about 2.6 miles SSW of Natviktangen Light and seldom breaks. It has a least depth of 18m and forms the outermost danger lying to the S of the light.

Roynevardsgrunnen (58°08'N., 8°20'E.), a detached rocky shoal, lies about 2.5 miles ESE of Natviktangen Light and has a least depth of 16m. Sandsloa, an isolated rocky patch with a least depth of 19m, lies about 0.3 mile SW of this shoal. These rocky patches form the outermost dangers lying to the E of the light.

Makrelhausen (58°09'N., 8°20'E.), a detached rocky shoal, lies about 2.6 miles ENE of Natviktangen Light and has a least depth of 12m. A group of rocky patches, with depths of 3 to 10m, extends up to about 0.8 mile N of this shoal. Together, these rocky patches form the outermost dangers lying to the ENE of the light.

Justoya (58°13'N., 8°22'E.) lies 5.5 miles NE of Natviktangen Light, in the SW approach to Lillesand. This large island is located within an area consisting of a multitude of offlying small islands and islets. Several narrow winding fjords indent this part of the mainland.

1.18 Nodingen (58°11'N., 8°22'E.), a flat-topped islet, lies 0.5 mile SSE of the S end of Justoya. It is marked by a prominent pyramidal beacon. A rocky shoal patch, with a depth of 7.5m lies about 0.6 mile SSE of this islet and at the seaward extremity of a chain of dangers extending ESE from the coast.

Mebo Beacon, a prominent tower, stands at an elevation of 49m on the E side of Justoya, 1.5 miles NNE of Nodingen.

Reierskjaer Light (58°12'N., 8°24'E.) is shown from a structure standing on a rock lying off the SE side of Justoya, 1.1 miles NE of Nodlingen. Several detached rocky shoal patches, with depths less than 10m, lie up to about 0.8 mile SSW, 0.5 mile SSE, and 0.3 mile E of this light.

Bregen (58°12'N., 8°25'E.), a rock awash, lies about 2.2 miles ENE of Nodingen and at the E side of an extensive shallow reef. The reef, which may best be seen on the chart, lies in the S approach to Lillesand and is marked by buoys and perches.

Gasa Light (Gasen) (58°13'N., 8°28'E.), equipped with a racon, is shown from a post, 11m high, standing on a small islet lying about 2 mile NE of Bregen, in the SE approach to Lillesand. Shoals, with rocks awash, extend about 0.4 mile E, SE, and SW from the light. These shoals form the outermost dangers in this vicinity.

Numerous channels entered from seaward lead through the off-lying dangers fronting this stretch of coast. In addition, channels branching from the inner passage lead to several small harbors, anchorages, and marinas. However, local knowledge and local large-scale charts are required for navigation in this area.

The main anchorages and harbors situated along this stretch include Ulvoysund (58°07'N., 8°13'E.), which is used by fishing vessels, and Risholmfloa (58°09'N., 8°16'E.).

Lillesand (58°15'N., 8°23'E.)

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1.19 Lillesand, a coastal harbor and summer resort, is situated on the NW side of a fjord and sheltered by the many islands lying in the entrance.

Tides—Currents.—Neither currents or tidal waters are especially noticeable in the harbor, which is also generally ice free in winter.

Depths—Limitations.—The main approach to the harbor is from SE, passing between Gasa Light and Bregen. The channel has a least depth of 55m.

The main harbor provides 13 berths. Dypvannskaia, the largest, is 80m long and has depths of 8.5 to 16.4m alongside. There are also two berths at Fossbekk, 0.4 mile SW of the main harbor. The largest is 50m long and has depths of 9.3 to 10.5m alongside. Vessels up to 17,000 dwt, 200m in length, and 9m draft can be handled alongside.

The port provides lay-up facilities for vessels up to 135,000 dwt and 275m in length.

Aspect.—Saltholmen Light (58°14'N., 8°24'E.), shown from a structure, 5m high, standing 2.1 miles WNW of Gasa Light, indicates the outer approach from SE. A conspicuous white building is situated close to the light.

Saltholmen Light

A prominent church, yellow with a dark gray roof and a spire, stands in the town. Floresteinen, a prominent hill, rises close E of Lillesand and is 82m high. Hisasen, another hill, rises about 4.5 miles NNE of the town and is 242m high.

Pilotage.—Pilots are provided by the station at Kristiansand and may be contacted by VHF. They board vessels about 2.5

miles ESE of Oksoy Light (58°04'N., 8°03'E.), off the entrance to Kristiasandsfjorden, or 1.5 miles ESE of Torungen Light (58°24'N., 8°48'E.), off Arendal. Vessels should send an ETA and arrange pilotage services through Oslofjorden 24 hours in advance (see paragraph 1.1). They should also send an ETA to the port through their agent 24 hours, 12 hours, and 6 hours in advance.

Anchorage.—Anchorage is available, in depths of 20 to 30m, sand and clay with good holding ground, in the fjord off the harbor. Local knowledge is advised. Anchorage is also available, in depths of 30 to 40m, mud, within Skallefjorden, a large and sheltered fjord lying 1 mile SW of the town.

Caution.—A magnetic anomaly, amounting to a decrease of about 3° in variation, is reported to exist within an area located in the approaches, about 1 mile WNW of Gasa Light.

1.20 Homboroya (58°15'N., 8°31'E.), lying 2.1 miles NE of Gasa Light, is an island fringed by several islets and rocky shoals. A beacon stands on its E extremity. This island is somewhat lower than the mainland coast and can easily be identified.

Homborsund Light (58°15'N., 8°32'E.) is shown from a tower on a building, 20m high, standing on the S end of an islet lying close off the NE side of Homboroya.

Homborsund Light

Knatten (58°15'N., 8°33'E.), a detached shoal patch, lies about 0.9 mile ESE of Homborsund Light. It has a least depth of 13m and forms the outermost danger in this vicinity.

Bjoroya (58°17'N., 8°33'E.), an island, lies 2.3 miles NNE of Homborsund Light and rises to a height of 34m in its N part. A light is shown from its NE extremity. This island forms part of the SE side of Bufjorden and encompasses an area of the mainland coast which is indented by many inlets and fronted by numerous off-lying islets and isolated dangers.

Stangholmen Light (58°18'N., 8°36'E.) is shown from a structure standing on the S end of the southernmost of a group of islets, 3.2 miles NE of Homborsund Light. A prominent beacon, 3m high, stands on a rocky shoal, 0.7 mile SSW of the light.

Grundsletta (58°15'N., 8°33'E.), a detached shoal patch, lies about 1.4 miles SE of Stangholmen Light. It has a least depth of 11.5m and forms the outermost danger in this vicinity.

Grosfjorden (58°19'N., 8°35'E.) extends about 2.3 miles NNE from a position located about 1 mile NE of Bjoroya Light. The entrance to this fjord is narrow and encumbered by numerous rocks, islets, and shoals. It has depths of 9 to 15m, but inside the fjord the depths increase to over 50m.Vikkilen, the continuation of Grosfjorden to the N of Grimstad, is relatively free of dangers and has depths up to 30m.

1.21 Grimstad (58°20'N., 8°36'E.), a small port, is situated in a cove on the W side of Grosfjorden, 3 miles NNE of Bjoroya Light. It is also a summer resort and boat building center.

Grimstad

Tides—Currents.—The rise and fall of the tide is minimal. Currents within the harbor are insignificant. Ice is generally negligible, except during especially severe winters when the harbor may freeze over for short periods.

Depths—Limitations.—Numerous narrow channels lead between the off-lying islets and rocks into the fjord. The main entrance route is from the S, passing ENE of Knatten and E of Bjoroya. It has a controlling depth of 14m.

The port provides about 500m of commercial quayage. The largest berth is 90m long and has depths of 6 to 15.9m alongside. There are facilities for general cargo, bulk, ro-ro, and container vessels. Vessels up to 60,000 dwt, 200m in length, and 9.2m draft can be accommodated.

Aspect.—A prominent church, yellow with a dark green roof and gray spire, stands in the town.

Homborsundsfald (58°28'N., 8°31'E.), a mountainous plateau, stands about 8 miles NNW of Grimstad. The steep slope at its E end is very conspicuous from S.

Pilotage.—Local knowledge is required. Pilots are available from the stations at Arendal and Kristiansand. They may be contacted by VHF and board about 1.5 miles ESE of Torungen Light (58°24'N., 8°48'E.). Vessels should send an ETA and arrange pilotage services through Oslofjorden 24 hours in advance (see paragraph 1.1). Vessels should also send an ETA to the port through their agent 24 hours, 12 hours, and 6 hours in advance.

Anchorage.—The main anchorage is within Vikkilen, the continuation of Grosfjorden above the harbor. There are depths of 30 to 40m in the S part and 10 to 15m in the N part.

1.22 Hesnesbregen Light (58°18'N., 8°40'E.) is shown from a tripod structure, 14m high, standing on the southernmost of a group of shallow rocky shoals, 2.3 miles ENE of Stangholmen Light. These shoals form the outermost dangers in this vicinity.

Hesnesoya (58°20'N., 8°39'E.) lies close offshore, 1.5 miles

N of Hesnesbregen Light. This island is comparatively low but it stands out against the prominent reddish-brown color of the mainland background, even during periods of poor visibility. Tonneholmen, an islet, is situated close off the E side of Hesnesoya. It is 6m high and marked by a prominent beacon.

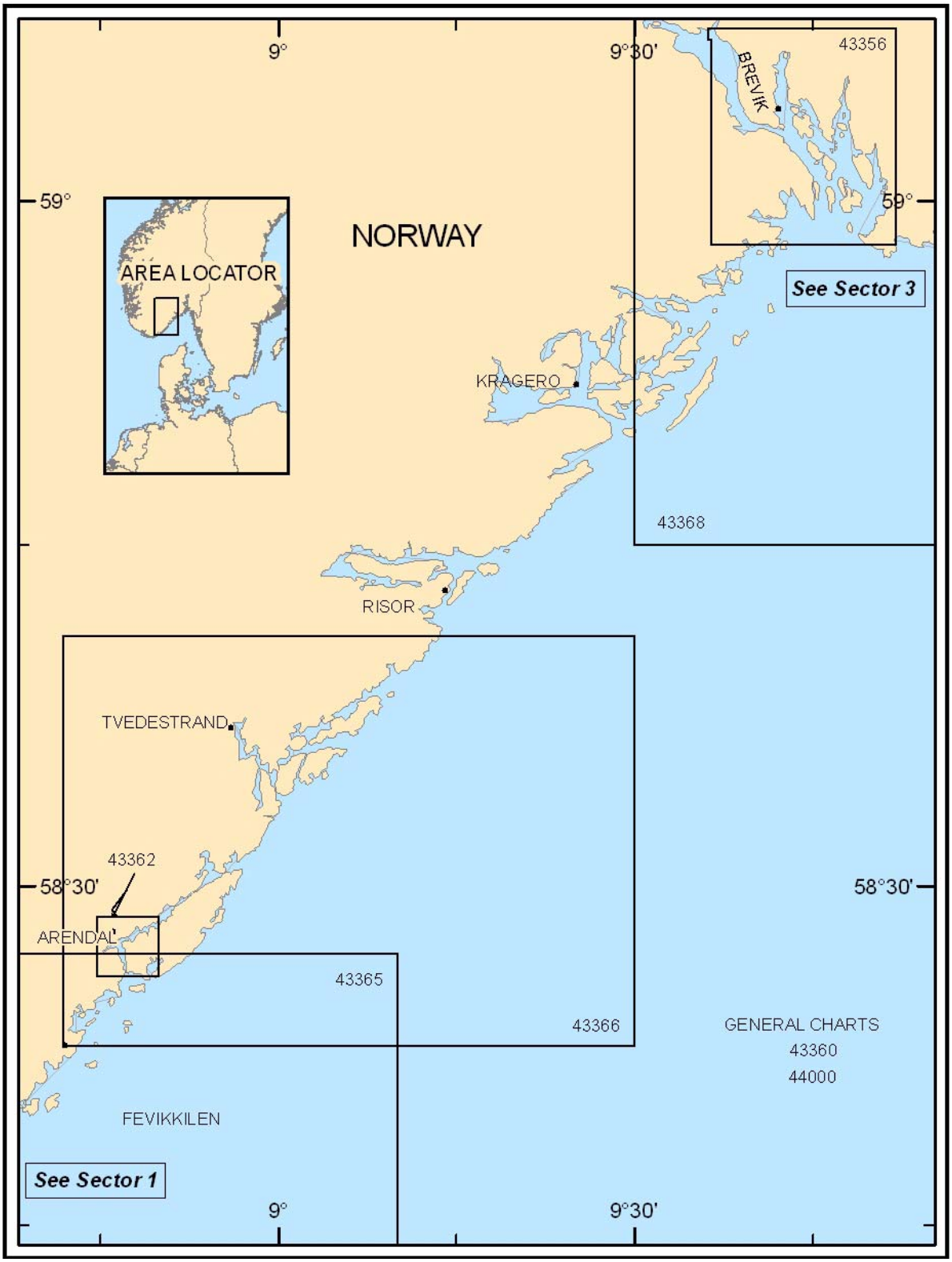
An arc of off-lying islets and dangers, which may best be seen on the chart, extends E for about 1.5 miles from Hesnesoya and then continues NNE for 5 miles into the S approaches to Arendal.

Sandoddryggene, with depths of 2.7 to 8m, lies about 2.2 miles ENE of the E side of Hesnesoya. This shoal bank forms the outermost danger at the SE side of the arc. Other shoal banks, with rocks awash, lie centered 1 mile and 2.1 miles NNE of Sandoddryggene. Several passages, available to small vessels with local knowledge, lead through the off-lying dangers extending in a NE direction from Hesnesoya.

Numerous channels entered from seaward lead through the off-lying dangers fronting this stretch of coast. In addition, channels branching from the inner passage lead to several small harbors, anchorages, and marinas. However, local knowledge and local large-scale charts are required for navigation in this area.

The main anchorages and harbors situated along this stretch include Bufjord (58°18'N., 8°32'E.) and Fevikkilen (58°22'N., 8°41'E.).

Torungen Light (58°24'N., 8°48'E.), equipped with a racon, is situated 6.8 miles NE of Hesnesbregen Light, in the approaches to Arendal. It is fully described in paragraph 2.2.3



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **2** — CHART INFORMATION

SECTOR 2

NORWAY—SOUTHEAST COAST—ARENDAL TO LANGESUNDSFJORDEN

Plan.—This sector describes the SE coast of Norway for a straight line distance of about 50 miles between the approaches to Arendal and Langesundstangen, the W entrance point of Langesundsfjorden. The description is SW to NE.

General Remarks

2.1 The SE coast of Norway between Arendal and Langesundsfjorden is primarily a monotonous succession of level land and unremarkable, rounded hills. The coast is less irregular than that extending SW from Arendal to Lindesnes and the off-lying islands, islets, and rocks tend to be situated closer inshore. These dangers decrease in number to the NE.

Natural landmarks and distinguishing features are few and widely separated. Those more easily observed by vessels navigating off the coast include the three mountain peaks of Tromlingene (58°38'N., 8°38'E.), the irregular ridge of Hovdefjell (58°42'N., 8°40'E.), and the elongated island of Jomfruland (58°51'N., 9°36'E.).

An inner passage, available to small vessels with local knowledge, leads between the mainland coast and the archipelago of off-lying islands and islets, which is known as Skjaergarden. The passage from Arendal to Lyngor (58°38'N., 9°09'E.) is generally quite deep and sheltered, except in the area of Flostaoya (58°51'N., 9°36'E.), where the route is more exposed. From Lyngor to Langesundsfjorden, the nner passage is exposed for considerable stretches, except in the area of Jomfruland (58°51'N., 9°36'E.).

Pilotage.—The waters and ports described in this sector lie within the Oslofjorden (Horten) Pilot Booking Center Area, which extends E from Egersund (58°27'N., 6°00'E.) to the Swedish border. All vessels must send an ETA and arrange pilotage services through Oslofjorden Pilot Booking Center 24 hours prior to arrival. The practice of requesting pilots through the local stations has been discontinued. For further details, see Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

Regulations.—Sea Safe Net (SSN) is a mandatory reporting system operated by the Norwegian Coastal Administration for all vessels entering Norwegian ports. For further details, see Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

Special recommendations concerning routes apply to tankers of 40,000 dwt and over navigating along the coast and are described in paragraph 1.1.

Directions.—From a position located about 4 miles ESE of Torungen Light (58°24'N., 8°48'E.), in the approaches to Arendal, the coastal route leads NE for 20 miles to a position about 6 miles ESE of Lyngor (58°38'N., 9°09'E.). It passes outside the 200m curve and clear of all dangers. The route then continues NE for 20 miles to a position located 7 miles SW of Tvistein Light (58°56'N., 9°56'E.). It passes outside the 100m curve and clear of all dangers. For routes concerning tankers of 40,000 dwt and over, see paragraph 1.1.

An inner passage, available to coasters and small craft, leads between the mainland coast and the archipelago of off-lying islands and islets. However, local knowledge and local large-scale charts are required for navigation along this route.

Caution.—An extensive aerial target firing area lies off much of the coast and extends seaward from the approaches to Langesundsfjorden. In addition, several coastal artillery firing areas are located in the immediate approaches to Langesundsfjorden. Warnings are disseminated by local notice to mariners and coastal radio stations.

Certain areas within the Sorlandet Maritime Defense District are prohibited to navigation. These areas generally lie within 50m of the shore around Hisoy (58°26'N., 8°46'E.), in the approach to Arendal. However, details of the limits should be obtained locally. Photography is also prohibited. For further details, see Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

The dangers fronting this part of the coast lie about 2 to 5 miles offshore. The outer ones are steep-to and vessels should keep well clear of them in thick weather.

Vessels are advised to stay well clear of the coast during onshore winds which are often accompanied by fog or mist. These winds influence the current and often cause a strong set toward the land.

Approaches to Arendal

2.2 **Torungen Light** (58°23.9'N., 8°47.5'E.), equipped with a racon, is shown from a prominent tower, 34m high, standing on Tyre Tourneying, an islet lying in the outer approach to Arendal.

Torungen Light

Heksebaen, with a depth of 5.5m, lies about 0.8 mile S of Torungen Light. This shoal patch is the outermost of a group of islets, rocks, and shoals which extend SSW from Ytre Torungen.

A detached rocky shoal, with a depth of 19m, lies about 0.5

Arendel—Southeast Approach

mile ESE of Torungen Light and another rocky shoal, with a depth of 19m, lies 0.3 mile NNE of it. These shoals form the outermost dangers lying E of Ytre Torungen.

Lille Torungen Light (58°24.6'N., 8°47.6'E.) is shown from a structure standing on the SE end of Indre Torungen, an islet lying 0.8 mile N of Torungen Light. A conspicuous disused lighthouse, 29m high, is situated in the middle of this islet.

Indre Torungen Light Tower (disused)

Hagasgrunnen, a shoal patch with a depth of 7.3m, lies about 0.4 mile SE of Lille Torungen Light. Makrelbaen, a detached shoal bank, lies centered 0.5 mile E of Lille Torungen Light. It has depths of 5.8 to 11.9m and is marked by a buoy. Lordsbaen, with a least depth of 7m, is an isolated rocky shoal lying about 0.4 mile ENE of Lille Torungen Light. These shoals form the outermost dangers lying E of Indre Torungen.

Detached rocky shoals, with depths of 2m and 5.7m, lie about 0.2 mile and 0.4 mile, respectively, SSW of Lille Torungen Light and are marked by perches.

Merdoy Light (Merdo) (58°25.5'N., 8°47.6'E.) is shown from a structure standing on the W extremity of an island of the same name lying 0.8 mile NNE of Lille Torungen Light.

Kankene, a group of shallow shoals, lies centered 0.4 mile SSE of Merdoy Light and is marked by a buoy on its SW side.

Sandvikodden Light (58°26'N., 8°47'E.), located 0.8 mile NNW of Merdoy Light, is shown from a structure, 17m high, standing on the W entrance point Galtesundet.

Sandvikodden Light

Directions.—Galtesundet (58°26'N., 8°47'E.) forms the main entrance channel leading to Arendal. This passage separates the island of Hisoy (58°26'N., 8°46'E.) from the W end of the large island of Tromoy. It is approached from SE of Torungen Light. Vessels should proceed NW in the white sector of Lille Torungen Light and pass close NE of Hagasgrunnen.

When about 0.4 mile from the light, they should steer NNW toward the range formed by Merdoy Light and Sandvikodden Light. After passing ENE of Indre Torungen, vessels should then continue to adjust their course NW and N in order to pass through Galtesundet.

A secondary entrance channel leads through Tromoysundet (58°30'N., 8°53'E.), a sound about 8 miles long lying between the mainland and the N side of Tromoy. The main seaward approach to this sound is from ENE in the vicinity of Bondon Light (58°31'N., 8°59'E.).

Tromoybrua (58°28'N., 8°49'E.), a suspension bridge, spans Tromoysundet about 1.7 miles E of Arendal and has a vertical clearance of 37m over a width of 100m.

Caution.—Several submarine cables, which may best be seen on the chart, extend seaward from the vicinity of Indre Torungen.

Arendal (58°28'N., 8°46'E.)

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2.3 Arendal, an industrial and commercial town, stands at the SW end of Tromoysundet, a sound about 8 miles long lying between the mainland and the large, forested island of Tromsoy. Several summer resorts are situated in the surrounding area.

Arendal

Ice.—Ice is seldom a hindrance and, if necessary, the port is kept open by an icebreaker during severe winters.

Tides—Currents.—The tidal currents and water level fluctuation are negligible; the tidal range is approximately 0.3m.

The outflow from the Nidelva River, which enters the sound close WSW of the town, causes a constant ENE set through the harbor area. The greatest outflow occurs with the melting snows of spring or after heavy rainfall. The set may attain a maximum rate of 4 knots but rapidly decreases to relative insignificance about 0.5 mile E of the town.

Depths—Limitations.—The least depth in the entrance channel is 22m. The port provides about 1,000m of main commercial quayage with 27 berths. The largest berth is 230m long, with depths of 9.4 to 15.7m alongside. Vessels up to 50,000 dwt and 10m draft can be accommodated.

A shipyard, which constructs structures for the offshore exploration industry, is situated at Vindholmen, on the N side of Tromoysundet, 0.6 mile W of the suspension bridge. It has a berth, 86m long, with depths of 6.7 to 8.6m alongside.

A bunkering berth is situated at Steinbukta, close SSW of Sandvikodden Light. It is 80m long and has depths of 10.9 to 12.9m alongside.

A smelting facility is situated at Eydehavn on the N side of Tromoysundet, about 2.2 miles NE of the suspension bridge. It is fronted by four berths. The largest is 176m long and has depths of 5.2 to 9.5m alongside.

Aspect.—The surrounding terrain is tree-covered with rocky shores. A conspicuous church, white with a dark roof, stands on the seaward side of Tromoy, 3.2 mile NE of Lille Torungen Light. It has no tower but is very prominent from E.

Veden, a prominent hillock, rises in the SW part of Tromoy, 0.7 mile ENE of Sandvikodden Light. It is rounded and 52m high.

Pilotage.—Pilotage is compulsory for vessels over 100 tons. Vessels should send an ETA and arrange pilotage services through Oslofjorden 24 hours in advance (see paragraph 2.1). Pilots can be contacted by VHF channel 16, 13 or telephone (47 33 034970); pilots board about 0.7 miles SE of Ytre Torungen (58°23.'N., 8°48.5'E.). This station also provides pilots for Risor and Grimstad.

Port of Arendal can be contacted on VHF channel 16, 12, and 13 and also by:

Telephone: 47 37 01357

E-mail: post@arendalhavn.no

Website: http://www.arendalhavn.no

Regulations.—Within Galtesundet, N of Sandvikodden Light, and within Tromoysundet, W of the bridge, speed limits of 6 knots apply to deep-sea vessels and 12 knots to pleasure craft. Within the inner harbor area, a speed limit of 6 knots applies to all vessels. This rule does not apply to sea planes when landing or taking off.

Anchorage.—The bay lying 0.7 mile E of Sandvikodden Light provides good anchorage for vessels up to 10,000 dwt. Vessels may anchor, in depths of 15 to 25m, sand and clay, with good holding ground.

Vessels may anchor within a bay, on the N side of Tromoysundet, lying off the E side of Buoya (58°30'N., 8°54'E.). This anchorage has a depth of 34m, clay with good holding ground, but the swinging room is limited.

Vessels may also anchor, in depths of 20 to 25m, anywhere within the inner harbor area, clear of the main channel. There is good holding ground of clay and mud, but local knowledge is advised.

Caution.—Several ferries navigate within the harbor area and its approaches.

Seaplanes land and take off within Tromoysunde.

Several submarine pipelines and cables, best be seen on the chart, extend across the harbor area and its approaches.

Arendal to Risor

2.4 The coast between Arendal and Sildeodden, a main-

land point about 18 miles NE, is indented by a series of small inlets. Oksefjorden, the largest of these inlets, forms the most considerable and central of all the indentations within the area. Inland, the terrain in the SW part is mostly flat, becoming progressively higher and more forested to the NE of Arendal.

The mainland shore is sheltered by uninterrupted groups of off-lying islands, islets, and rocks. These dangers are difficult to distinguish from the mainland background because of their generally gray color and low character.

Tromlingene (58°38'N., 8°38'E.), located about 12 miles NNW of Arendal, consists of three conspicuous mountain summits rising in a row. Hovdefjell (58°42'N., 8°40'E.), rising about 4 miles NNE, is a rather irregular ridge somewhat less conspicuous than Tromlingene. In clear weather, both of these landmarks have been observed from a distance of 50 miles.

The outer dangers lying along this part of the coast are steep-to and vessels should stay well clear of them in thick weather. Vessels are also advised to stay well clear of the coast during onshore winds which are often accompanied by fog or mist. These winds influence the current and often cause a strong set toward Tromoy.

Tromoy (58°28'N., 8°58'E.), a large and low island, extends about 8 miles NE and fronts the mainland to the E of Arendal. Its SE side is indented by several inlets and fronted by numerous dangers, which may best be seen on the chart.

Alvekilen (58°28'N., 8°53'E.), a narrow inlet, indents the SE side of Tromoy and provides anchorage for small vessels, in a depth of 7m, mud and sand. Local knowledge is advised.

Batstangen, a low and light-colored point, is located on the S side of the entrance to this inlet.

Tallaken, a detached rocky shoal patch, lies about 0.5 mile SSE of Batstangen and has a least depth of 1.8m. Ravnasknatten, another detached shoal patch, lies about 0.7 mile E of Batstangen and has a least depth of 7.9m. These shoals form the outermost dangers in the approach to Alvekilen.

Brenningane, a shoal bank, lies about 1.2 miles NE of Batstangen at the N end of a group of rocky patches. It has rocks, awash, and is marked by a beacon, 2m high.

2.5 Bonden Light (58°31'N., 8°59'E.) is shown from a structure standing on the NW edge of a rocky shoal lying about 0.7 mile from the mainland coast. A beacon is situated close to the light.

Numerous islets, rocks, and shoals, which may best be seen on the chart, front the seaward side of this light and extend up to about 1.2 miles NE, 0.7 mile SE, and 1.5 miles SSW of it.

Gitmertangen, the NE extremity of Tromoy, is located 1.3 miles SW of Bonden Light and is marked by a light.

Dybingsbaen, a detached shoal patch, lies about 1.4 miles S of Gitmertangen. It has a least depth of 3.3m and is marked by a buoy. Rosbaen, a rocky shoal, lies about 0.3 mile ENE of Dybingsbaen. It has a least depth of 0.9m and is marked by a perch.

Tromsoysundet, the sound extending SW to Arendal, is entered close N of Gitmertangen. Skinnfelltangen Light, located 0.3 mile NNW of Gitmertangen, is shown from the N entrance point of the sound. An approach route from seaward leads in a N direction between the E side of Tromoy and Dybingsbaen. It continues in a NNE direction, passing W of the dangers lying S of Bonden Light, and rounds Gitmertangen.

Bondedybet, which forms the main approach from seaward, is entered about 2.5 miles NE of Gitmertangen. This channel leads in a SW direction through the off-lying dangers. The fairway passes close NW of Bonden Light and is indicated by range lights situated in the vicinity of Gitmertangen. Local knowledge is advised.

2.6 Oksefjorden (58°35'N., 9°00'E.), which extends about 5 miles NW, is entered about 2.5 miles NNE of Bonden Light. The entrance of this fjord is fronted by a scattered multitude of islets, rocks, and shoals, which extends NE for about 4 miles from Bonden Light and may best be seen on the chart. Most of the outer submerged dangers are steep-to and lie unmarked except for the breakers that occur over them.

Oksefjorden Light (58°33.7'N., 9°00.3'E.) is shown from a structure standing on the E end of an islet, which lies 2.4 miles NNE of Bonden Light and forms the W entrance point. The E entrance point of the fjord, located 0.4 mile NNE of this islet, is formed by the S extremity of Boroya.

Tverrdalsoy Light is shown from a structure standing on Holmesundsodden, 0.3 mile SSW of Oksefjorden Light.

Kilsund Light (58°33.0'N., 8°59.5'E.) is shown from a structure standing on the NE end of Flostaoya, 0.4 mile SSW of Tverdalsoy Light.

Ice.—Ice is frequent and the inlet may be closed from March to April in severe winters.

Tides—Currents.—The tidal rise is small. The tidal current usually sets S in the winter, except during E gales. In the summer, the current sets N in the morning and S in the afternoon.

Directions.—From a position located about 1.5 miles NE of Bonden Light, the main approach from seaward to Oksefjorden leads NW through the off-lying dangers, using the white sector of Kilsund Light. From a position located about 0.2 mile SE of Kilsund Light, the route continues NNE toward the entrance of the fjord, passing close ESE of Tverdalsoy Light. The route then rounds Oksefjorden Light and leads in mid-channel through the inlet.

2.7 Tvedestrand (58°37'N., 8°56'E.), a small harbor, is located within a cove at the head of Oksefjorden. It is used mostly by fishing boats, pleasure craft, and local timber vessels.

Depths—Limitations.—The main commercial quay, situated at the SW side of the cove, is 73m long and has depths of 7.4 to 8.6m alongside. Small vessels with drafts up to 5.9m can be accommodated.

Pilotage.—Pilotage is compulsory. Pilots are provided by the station at Arendal. Vessels should send an ETA and arrange pilotage services through Oslofjorden 24 hours in advance (see paragraph 2.1).

Anchorage.—Small vessels can anchor in the outer harbor, in a depth of 14m, good holding ground, with stern moorings.

General anchorage, in depths of 17 to 30m, with good holding ground, may be found off several coves throughout Oksefjorden. Local knowledge is advisable.

General anchorage, in depths of 18 to 53m, soft bottom, good holding ground, may be found throughout Havefjorden (58°35'N., 9°02'E.), a fjord entered about 1 mile NNE of Oksefjorden Light.

2.8 Sildeodden (58°40'N., 9°12'E.), a mainland point, is

located about 9 miles NE of the entrance to Oksefjorden. The coast between is characteristically irregular. It is fronted by several large islands and a number of smaller islands which may best be seen on the chart. These islands are generally lower than the mainland and tend to blend in with the background. However, the openings separating the islands are very distinguishable from seaward.

The outer sides of the islands are fronted by numerous islets, rocks, shoals, and reefs which extend up to about 1.2 miles offshore. Several deep passages lead from seaward through these dangers.

Torskbaen (58°35'N., 9°06'E.), the outermost danger, is a narrow submerged reef which lies parallel to the shore and is about 4.5 miles long. It is located about 1 mile offshore and is marked by breakers during heavy seas.

Persknatten (58°39'N., 9°13'E.), a detached shoal patch, lies about 1 mile SSE of Sildeodden and has a depth of 19.8m. Fidjebaen, a large shoal bank, lies 1.2 miles ENE of Sildeodden. It has a least depth of 7.9m and is marked by a buoy. These shoals form the outermost dangers in this vignette.

Lyngor Light (58°38'N., 9°09'E.) is shown from a prominent building with a tower, 17m high, standing on the S end of Kjeholmen, a small island lying 2.5 miles SW of Sildeodden.

Lyngor Light

The inner passage, available to coasters and small craft, leads through the archipelago of off-lying islands. However, local knowledge and local large-scale charts are required for navigation along this route. The channels are narrow in places but generally quite deep.

Numerous passages lead from seaward through the off-lying dangers to the many inlets indenting this stretch of coast. In addition, channels branching from the inner passage lead to several small harbors, anchorages, and marinas. The main anchorages and harbors lying within this archipelago include the following:

1. Lyngor (58°38'N., 9°08'E.).
2. Krakvag (58°37'N., 9°02'E.).
3. Dypvagkilen (58°38'N., 9°04'E.).
4. Ostre Askeroy (58°37'N., 9°06'E.).
5. Vestre Askeroy (58°36'N., 9°03'E.).
6. Vollen (58°39'N., 9°09'E.).
7. Klaholmen (58°36'N., 9°05'E.).

2.9 **Sandnesfjorden** (58°42'N., 9°12'E.), entered about 2.3 miles NNE of Sildeodden, extends about 5 miles WSW from its entrance. This narrow and wooded fjord is quite deep throughout, except in the W part. The entrance is encumbered by several islands, islets, and rocky shoal patches.

Store Furuoy, a small and hilly island, lies in the approaches; entrance passages lead N and S of it. Anchorage is available, in depths of 10 to 30m, mud, good holding ground, within several small coves which indent the sides of this fjord. Local knowledge is required.

Sondeledfjorden (58°44'N., 9°11'E.), about 5 miles long, lies 2 miles N of Sandnesfjorden and has high, wooded shores. This fjord, which is about 1 mile wide, is divided into two parts by the island of Barmen. Nordfjorden, the N part, is deep and relatively unencumbered. Sorfjorden, the S part, is deep but encumbered by several islets and numerous shoal patches. Its E end is obstructed by a low bridge which connects Barmen to the mainland.

Stangholmen Light (58°42'N., 9°14'E.) is shown from a structure standing on the NE side of Store Stangholmen, a small island lying about 1.3 miles NNE of the S entrance point of Sandnesfjorden. A former lighthouse building is situated close to the light.

Stangholmen Light

Risor (58°43'N., 9°14'E.)

World Port Index No. 23630

2.10 Risor is situated at the E end of the promontory which separates Sandnesfjorden from Sondeledfjorden. The harbor is sheltered by a number of small islands and islets, but is exposed to the S.

Ice.—The harbor is free of ice except during very severe winters.

Tides—Currents.—The tides and currents are negligible.

Depths—Limitations.—The harbor can be approached from E through Gronholmgapet (58°44.5'N., 9°20.0'E.), but this passage is tortuous and narrow. The main approach is from S via Stangholmgapet. Vessels proceed NNW, using the white sector of Stangholmen Light, and then pass close E of Store Stangholmen. They continue N to the harbor using a lighted range.

There are two main commercial facilities. Dampskipbrygga, a berth located in the S part of the harbor, is 112m long and has depths of 5.1 to 7.3m alongside.

A concrete quay is situated in Kranfjorden, which lies between the SE side of Barmen and the mainland. It is 120m long and has a depth of 9.1m alongside. Vessels up to 10,000 dwt and 8.5m draft can be accommodated.

Aspect.—Risor Flekk, located close E of Risor, is a conspicuous white patch, situated high up on the face of a rocky wall, which can be distinguished from a considerable distance to seaward. A conspicuous building stands on a small promontory in the N part of the harbor. The town is prominent because the majority of the houses are painted white.

Pilotage.—Pilotage is compulsory for vessels over 100 tons. Pilots are provided by the stations at Langesund (Brevik), Arendal, and Kristiansand. Vessels should send an ETA and arrange pilotage services through Oslofjorden 24 hours in advance (see paragraphs 2.1 and 2.3). Vessels should also send an ETA through the agent to the port 24 hours, 12 hours, and 6 hours in advance. Vessels should contact the pilot by VHF 2 hours prior to arrival.

Regulations.—A speed limit of 7 knots applies in the approaches within Store Stangholmen; a speed limit of 4 knots applies in the inner part of the harbor.

Anchorage.—Anchorage is available, in depths up to 45m, within the outer part of the harbor, but this roadstead is exposed to S winds. Sheltered anchorage is available, in a depth of 29m, within Kranfjorden, about 0.7 mile NW of Risor.

Caution.—During gales from S, the sea sometimes breaks across the narrow part of Stangholmgapet and entry is not possible.

Risor to Langesundsfjorden

2.11 Between Risor and Langesundsfjorden, about 25 miles NE, the mainland is somewhat exposed to the open sea. The coast is indented by two rather extensive inlets which trend through a hilly but generally level terrain. These inlets, which are fairly deep throughout, are fronted by numerous off-lying islands, rocks, and shoals.

Jomfruland (58°51'N., 9°36'E.), lying about midway along this section of the coast, is about 4 miles long and one of the outermost islands. Although low and mostly flat, this island is very distinctive.

Jomfruland Light is shown from a prominent tower, 31m high, standing 1.5 miles SSW of the N extremity of the island. A disused light tower is situated near the light; a conspicuous radio mast, 100m high, stands 0.5 mile NNE of it. It is reported that the radio mast no longer exists.

Djupodden Light is shown from a structure standing near the middle of the island. A conspicuous beacon, 12m high, is situated near the SW end of the island, 1.4 miles SSW of this light.

Knubbehausen Light (58°48.8'N., 9°29.2'E.), equipped with a racon, is shown from a column, 12m high, standing on a rock, 4.7 miles SW of Jomfruland Light. Numerous dangers extend SW and NE of this light.

Stromtangen Light (58°50.1'N., 9°28.4'E.) is shown from a building with a tower on the side, 9m high, standing on the mainland, 1.4 miles NNW of Knubbehausen Light.

A mass of islands, islets, and rocky shoals lies between the mainland coast and the W side of Jomfruland. Several channels, available to coasters and small craft, lead through this mass and form part of the inner passage. However, local knowledge and local large-scale charts are required for navigation within this area.

Jomfruland Light

Stromtangen Light

Channels branching from the inner passage route in this area lead to several small harbors, anchorages, and marinas. The main anchorages and harbors lying within this archipelago include the following:

1. Portor (58°48'N., 9°26'E.).
2. Eidskilen (58°50'N., 9°19'E.).
3. Kjolebrunnkilen (58°50'N., 9°17'E.).
4. Kil (58°52'N., 9°19'E.).
5. Skatoy (58°51'N., 9°30'E.).
6. Korset (58°50'N., 9°31'E.).
7. Asvika (58°51'N., 9°29'E.).
8. Lokstadbukta (58°51'N., 9°34'E.).
9. Hovedgard (58°52'N., 9°36'E.).

2.12 **Straholmen** (58°54'N., 9°39'E.), a low and flat island, lies 1.2 miles NE of the N extremity of Jomfruland and is surrounded by rocks and shallow reefs. Mostein, a whitish-colored conical rock, lies 0.2 mile SE of the S end of this island and is conspicuous from seaward.

Jomfrulandsgapet, a shallow passage, leads between the N end of Jomfruland and Straholmen. The sea breaks across this channel during bad weather.

Svea, a detached shoal bank, lies 1.3 miles S of the S end of Straholmen. It has a least depth of 5m and is marked at the N

end by a buoy. Rislebaen, a shoal bank, lies centered about 1 mile ESE of the S end of Straholmen and has a least depth of 4m. These two shoals form the outermost dangers in this vicinity.

Steingrunnen (58°56'N., 9°44'E.), an extensive shoal area, lies about 2.7 miles NE of the N end of Straholmen. It has depths of less than 10m and is marked by a lighted buoy.

Ranheusen (58°56'N., 9°44'E.), a rocky shoal, lies about 0.5 mile NNW of Steingrunnen. It has a least depth of 2m and is marked by buoys. Sasteinsbaen, a shoal bank with a least depth of 13m, lies about 1 mile N of Ranheusen.

These shoals lie at the NE end of a chain of islets and rocks, which extends NE for about 3 miles from the N end of Straholmen, and form the outermost dangers along this part of the coast.

Numerous islets, rocks, and shoals lie between this outer chain and the mainland coast. Several winding and narrow channels, approached from N of Ranheusen, lead from seaward through this archipelago to a number of anchorages and small loading places. These passages are available to small vessels with local knowledge. Access to Kragero can be gained via a passage leading through Eksefjorden, Langarsund, and Kjopmannsfjorden.

Ice occurs in much of these inner waters from January to March, or in severe winters to the end of April, and closes most of the channels. The main anchorages and harbors include the following:

1. Barmskilen (58°56'N., 9°29'E.).
2. Fossing (58°56'N., 9°28'E.).
3. Vagoyfjorden (58°56'N., 9°34'E.).
4. Havsundhamn (58°56'N., 9°37'E.).
5. Bjornoybukta (58°58'N., 9°39'E.).

2.13 Kragero (58°52'N., 9°25'E.) (World Port Index No. 23640), a small port, is situated on the W side of Berofjorden. The town stands on the mainland coast about 4 miles NW of Knubbehausen Light. The harbor is well sheltered by the islands and islets lying W of Jomfruland.

Ice.—Ice forms over most of the inner waters in the approach to the harbor. However, entry is blocked only during severe winters.

Tides—Currents.—Tidal action is negligible. The offshore currents act under the influence of wind conditions and generally tend to set toward the land. Inshore currents generally set seaward out of the approach channels.

The water level is similarly influenced more by winds than tidal conditions. It rises with W winds and falls with E winds. The highest observed rise of the water level reached during storm conditions was 1.4m.

Depths—Limitations.—The least depth in the approach channels is 12.5m.

Stillnestangen Berth, located at the N end of the harbor, is 129m long and has depths of 3.7 to 10m alongside. Jernbanekaien Berth, located about 0.4 mile SSW of Stillnestangen Berth, is 101m long and has depths of 6.7 to 11.6m alongside. An automobile ferry berth, which provides ro-ro facilities, is 45m long and has depths of 3 to 7m alongside. Malmhella Hyperite Berth, located 0.3 mile NW of Stillnestangen Berth, is 61m long and has depths of 8.6 to 16.1m alongside. There are also several additional berths for small coasters and fishing vessels.

Vessels up to 20,000 dwt and 8.4m draft can be accommodated.

Pilotage.—Pilotage is compulsory for vessels over 50 grt. Pilots are provided by the station at Langesund . Vessels should send an ETA and arrange pilotage services through Oslofjorden 24 hours in advance (see para-graph 2.1). Vessels should also send an ETA through their agent to the port at intervels of 24 hours, 12 hours, and 6 hours prior to arrival. Vessels should contact the pilot by VHF channel 16 and 13 or telephone 2 hours prior to arrival.

Regulations.—When passing the outer approach lighted buoy, moored 1 mile SE of Knubbehausen Light, all vessels should give a general safety message on VHF channel 12, stating their name, position, and intended route.

Anchorage.—The main anchorage is in depths of 16 to 29m, good holding ground, within a bay lying close SSE of Stillnestangen Berth.

Directions.—The main approach to the harbor from seaward is from SE through Stanggapet (58°48.8'N., 9°29.4'E.). The entrance to the channel is reported to be marked by a lighted buoy moored about 1 mile SE of Knubbehausen Light. The narrow fairway leads through the off-lying dangers and continues NNW and NW between the mainland coast and the islands and islets lying W of Jomfruland. Local knowledge is required.

Langesundsfjorden

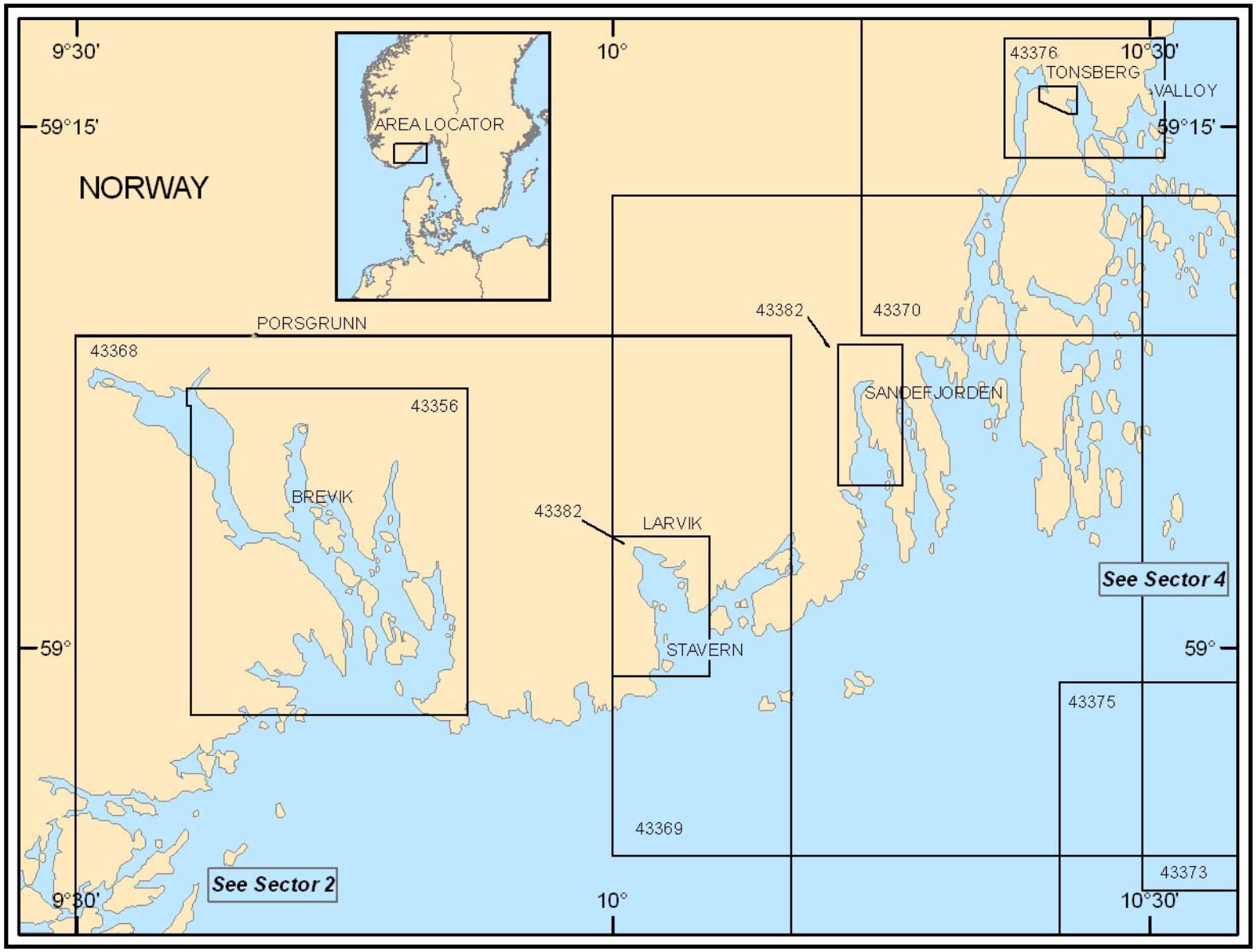
2.14 Langesundsfjorden (58°59'N., 9°45'E.), also known as Grenland Harbor, is entered about 7 miles NE of the N end of Jomfruland. The offshore area between first consists of a concentration of larger islands sheltering Kragero and then a scattering of islets and shoal extending NE in a series of almost parallel rows. The number of islets and shoals decreases to the NE then ceases altogether near Store Sastein (58°58.0'N., 9°42.4'E.), a reef-fringed island lying on the W side of the approach to Langesundsfjorden. Langesundsfjorden is further described beginning in paragraph 3.2

Mejulen (58°58'N., 9°42'E.), a gray islet, lies on the reef, 0.5 mile SW of Store Sastein, and a light is shown from its W side. A wide marble stripe runs from the summit of this islet down to the sea and is very conspicuous.

Abyfjorden (58°59'N., 9°42'E.) and Rognsfjorden (59°00'N., 9°43'E.) are entered 0.9 mile NNW and 1.4 miles NNE, respectively, of Store Sastein. These fjords, which lie on the W side of the entrance to Langesundsfjorden, are used only by local small craft and have no commercial significance.

Langoytangen Light (58°59.4'N., 9°45.5'E.) is shown from the S end of Langoy, in the entrance to Langesundsfjorden, and is described in paragraph 3.2.

Tvistein Light (58°56'N., 9°56'E.), equipped with a racon, is located 9 miles NE of the N end of Straholmen, at the SE side of the approach to Langesundsfjorden, and is described in paragraph 3.9.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **3** — CHART INFORMATION

SECTOR 3

NORWAY—SOUTHEAST COAST—LANGESUNDSFJORDEN TO TONSBERGFJORDEN

Plan.—This sector describes the SE coast of Norway for a distance of about 21 miles between Langesundsfjorden and Helgerodtangen, which is the S extremity of Tjome and the W entrance point of Oslofjorden. The descriptive sequence is from W to E.

General Remarks

3.1 Between Langesundsfjorden and the entrance to Oslofjorden, about 21 miles NE, the coast is deeply indented and many dangers lie up to 4 miles offshore. The coast in this area has several deep indentations; from W to E the principal ones are Langesundsfjorden, Larviksfjorden, Sandefjorden, Tonsbergfjorden, and Oslofjorden.

The main ports are Langesund, Brevik, Porsgrunn, and Skien in Langesundfjorden (Grenland Harbor); Larvik, in Larviksfjorden; Sandefjord at the head of Sandefjorden; and Tonsberg, at the head of Tonsbergfjorden.

There is no continuous inner passage extending along this stretch of coast. Between Larviksfjorden and Tonsbergfjorden, the dangers fronting the coast are separated from the shore by areas of comparatively open water. Two inner passages, used by vessels with local knowledge, lead through these areas.

Aspect.—Stavernsadlen (59°03'N., 9°58'E.), standing 2.1 miles WSW of Larvik, is 222m high. This prominent hill has a deep cleft in the middle which is most apparent from SW.

Lovesnyta (59°08'N., 10°02'E.), with a prominent rocky summit, rises about 5 miles NNE of Stavernsadlen. This hill is 227m high and resembles a haystack.

Kjerringfjell (59°02'N., 10°12'E.), 116m high, stands near the coast on the W side of the entrance to Sandefjorden. This prominent hill is steep on its W side but appears to have a gradual slope when seen from SW. When seen from SE, at a distance of 16 to 20 miles, a deep cleft can be observed in the middle of the hill, just above the horizon.

Pilotage.—The waters and ports described in this sector lie within the Oslofjorden (Horten) Pilot Booking Center Area, which extends E from Egersund (58°27'N., 6°00'E.) to the Swedish border. All vessels must send an ETA and arrange pilotage services through Oslofjorden Pilot Booking Center 24 hours prior to arrival. The practice of requesting pilots through the local stations has been discontinued. For further details, see Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

Regulations.—Sea Safe Net (SSN) is a mandatory reporting system operated by the Norwegian Coastal Administration for all vessels entering Norwegian ports. For further details, see Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

The entry of foreign commercial vessels into the inner (internal) waters of Norway is restricted and certain regulations and procedures apply. For further details, see Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

Special recommendations, concerning routes, apply to tankers of 40,000 dwt and over navigating along the coast; for further information, see paragraph 1.1.

Directions.—From a position located about 10 miles SSE of the entrance to Langesundsfjorden, the coastal route leads ENE for about 25 miles to a position located at the entrance to Oslofjorden, 3 miles SSE of Faerder Light (59°02'N., 10°32'E.). It stays outside the 100m curve. For routes concerning tankers of 40,000 dwt and over, see paragraph 1.1.

Caution.—For information concerning Dangerous Wave Areas lying off this stretch of coast, see paragraph 1.2.

Langesundsfjorden

3.2 Langesundsfjorden (59°00'N., 9°48'E.), a large area of deep inlets indenting the mainland, is also known as Grenland Harbor. The area is entered between Store Sastein (58°58.0'N., 9°42.4'E.), a reef-fringed island, and Fugloya (58°57.9'N., 9°48.3'E.), a steep-to island lying 3 miles ENE.

Langesundsbukta, the body of water lying S of the entrance to Langesundsfjorden, is entered from seaward between Steingrunnen (58°56'N., 9°44'E.), an extensive shoal area, and the dangers fronting the mainland coast, about 4 miles ENE.

Skjeregg, a narrow islet lying on a rocky reef, is located 1.7 miles W of Fugloya and forms the outermost danger in the entrance.

Langesundfjorden has an irregular shape and extends for about 12 miles. The entrance is divided into four channels by the large islands of Langoya (58°59.0'N., 9°45.4'E.), Geitroya (58°59.0'N., 9°46.5'E.), and Aroya (58°59.0'N., 9°48.1'E.), as follows:

1. Langesund Channel leads between the mainland and the W side of Langoya. It provides access to Langesund Harbor.
2. Gamle Langesund Channel leads between Langoya and Geitroya but is almost completely obstructed by shoals.
3. Dypingen Channel, a main passage, leads N between Geitroya and Aroya. It continues NNW via Kjortingen Channel (59°00.5'N., 9°46.5'E.), which passes between the NE side of Geitroya and Kjortingen, a small islet lying on foul ground. The channel then leads into Brevikfjorden (59°01.2'N., 9°45.0'E.) which continues NW to Brevik.
4. Kaven Channel, a main passage, leads E through Helgerofjorden (58°59.5'N., 9°49.0'E.), which is entered between the N end of Fugloya and the S end of Aroya. It continues NW through Haoyfjorden (59°01.0'N., 9°48.2'E.) and Kavan (59°02.0'N., 9°46.2'E.). The channel then leads W via Kalvsundet (59°02.6'N., 9°44.5'E.) and joins Brevikfjorden.

Kaven Channel also provides access to the adjacent inlets of Morjefjorden (59°01'N., 9°50'E.), Langangsfjorden (59°04.0'N., 9°47.5'E.), and Ormefjorden. (59°03.4'N., 9°45.0'E.). The numerous islands lying between Kalven and Brevikfjorden are separated by passages which are available,

for the most part, to small vessels with local knowledge.

Brevikfjorden (59°01.2'N., 9°45.0'E.) is also known locally as Langesundfjorden. This inlet divides at Brevik (59°03'N., 9°42'E.), continuing N into Eidangerfjorden and NW into Frierfjorden.

Brevikstrommen is the narrow passage which leads in a W direction and connects the N end of Brevikfjorden with the S end of Frierfjorden.

The Skienselva River flows into the N part of Frierfjorden. Vollsfjorden (59°07'N., 9°33'E.) is the NW continuation of Frierfjorden.

Ice.—Ice occurs throughout Langesundsfjorden during the winter months from January to April and forms first in those areas where the current is weak, mainly in Brevikfjorden, Ormefjorden, and the N part of Kalven. During severe winters, ice may form over the entire inlet for a period of up to two months. Icebreaker service is available. The port of Langesund generally remains ice free.

Tides—Currents.—Generally, the current flow within Langesundsfjorden is most strongly influenced by the fresh water discharge from the rivers. Tides and meteorological conditions also have an affect. Surface currents are brackish to a depth of 1 to 2m and commonly set seaward over a weak inbound current.

During extreme conditions, the outbound current can reach a velocity of 3 to 4 knots in the narrows between Brevikfjorden and Frierfjorden, while at Kjortingen, in the entrance to Brevikfjorden (Langesundsfjorden), it still flows seaward with a rate of up to 1 knot. In exceptional cases, an inbound current can predominate, particularly during strong S winds.

Water discharged from the Skienselva River sets S through Frierfjorden toward Saltbua (58°04.'N., 9°38.7'E.), a mainland point, where an eddy forms that sends a weak current N along the E side of the inlet.

The current from the river continues S and enters Brevikfjorden. It sets strongly onto the island of Sandoya where it divides. The N branch flows into Eidangerfjorden and circulates counter clockwise at a velocity up to 3 knots; while the S branch continues seaward, with a strong set, onto the W side of the adjacent islands.

During floods, the outgoing flow in Brevikstrommen can attain a rate of 3 to 4 knots. Off Langesund, the flow attains a rate of 1 knot, but it can be a problem in the narrow passage.

Depths—Limitations.—The entire area of fjords lying within Langesundsfjorden is known collectively as Grenland Harbor. The Grenland Harbor Authority controls all shipping movements within this area.

Within Grenland Harbor, a local Traffic Separation Scheme has been established between the entrance and Brevik (59°03'N., 9°42'E.). This scheme includes Dypingen Channel and Kaven Channel. for further information, see Regulations.

The Grenland Center, based at Brevik, controls the use of these two channels and allocates the routes to be followed by all vessels.

The maximum size of vessels accepted for transit through the channels are given in the accompanying table.

The Brevik Bridge (59°03'N., 9°42'E.) spans the narrows of Brevikstrommen and connects Brevik to Stathelle. It has a vertical clearance of 45m over a navigable width of 100m.

The Grenland E18 Bridge spans Brevikstrommen about 0.6 mile WNW of the Brevik Bridge. It has a vertical clearance of 50m over a navigable width of 150m.

An overhead cable, with a vertical clearance of 45m, spans Brevikstrommen close W of the Grenland E18 Bridge.

Aspect.—The entrance to Langesundsfjorden itself is distinctive from seaward. The shores of the inlet consist mostly of steep rocky beaches backed by low, undulating, and forested terrain with scattered patches of cultivated land. Neighboring hills rise in gentle slopes and alternate with flat land.

Langoytangen Light (58°59.5'N., 9°45.5'E.) is shown from a prominent tower on a house, 14m high, standing on the S end of Langoy.

Langoytangen Light

A church standing in Langesund, about 0.6 mile NNW of the light, is conspicuous from seaward. It consists of a white structure with a tower and a slate roof.

A conspicuous radar scanner stands at the W side of Fugloya (58°57.9'N., 9°48.3'E.). A light is shown from an islet lying close NNW of the N extremity of this island.

Langesundsfjorden—Vessel Limitations

Channel	Maximum Vessel			Remarks
	Length	Draft	Beam	
Dypingen Channel	198.1m	10.4m	30.5m	The maximum beam when carrying dangerous cargo is 27.4m.
Kaven Channel	274.3m	14.2m	45.7m	
Brevikstrommen	198.1m	9.9m	30.5m	The maximum beam when carrying dangerous cargo is 27.4m. In special cases, during daylight, the length may be extended to 213.4m, the beam to 33.5m, and the draft to 11m for vessels not carrying dangerous cargo.

Pilotage.—Pilotage is compulsory for all foreign commercial vessels of 50 grt and over when navigating within the restricted area of Langesundsfjorden. Vessels should send an ETA and arrange pilotage services through Oslofjorden 24 hours in advance (see paragraph 3.1). A confirmation message should be sent 2 hours prior to arrival at the pilot boarding place. This station also provides pilots for Kragero and Larvik. Pilots can be contacted by VHF or telephone and board vessels about 3.2 miles SSE of Langoytangen Light.

Regulations.—The entire complex of Langesundsfjorden lies within the inner (internal) waters of Norway and entry is subject to special regulations. For further details, see Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

A Vessel Traffic Service (VTS) operates in the Grenland Harbor area and is mandatory for all vessels of 50 grt and over navigating within the Langesundsfjorden restricted zone. The VTS system is managed by the Brevik Sea Center, which may be contacted on VHF channels 16 and 80.

Vessels carrying dangerous cargo should send an ETA to the Traffic Center at least 24 hours in advance. Such vessels include tankers carrying gas, chemicals, and cargo carried in bulk with a flash point below 23°C; and tankers in ballast but not gas-free.

All vessels should obtain clearance at least 1 hour in advance of entering the area, leaving a quay, or leaving an anchorage within the area. The following details should be stated:

1. Vessel name and call sign.
2. Nationality and name of company.
3. Length, beam, and draft.
4. Height above surface.
5. Gross registered tons.
6. Port of destination.
7. Type of cargo.
8. Amount of dangerous cargo (tons).
9. ETA.
10. ETD.
11. Any further relevant information.

Vessels (underway, anchored, or moored) should maintain a continuous listening watch on VHF channels 16 and 80.

Vessels should obtain permission from the Traffic Center before anchoring and may be directed to a suitable anchorage.

Vessels should report to the Traffic Center on request, in the event of an accident, and when passing the following points, giving details as shown:

1. When entering the VTS zone:
   a. Vessel's name.
   b. Time of passing zone limit.
   c. ETA at quay or anchorage.
2. When arriving at a quay or anchorage:
   a. Vessel's name.
   b. Time of arrival.
3. When leaving a quay or anchorage:
   a. Vessel's name.
   b. Time of leaving.
   c. ETA at zone limit.
4. When leaving the VTS zone:
   a. Vessel's name.
   b. Time of passing zone limit.

If a report cannot be made by VHF, the Sea Traffic Center should be contacted by telephone, fax, or through Tjome (LGT) coast radio station.

If visibility is reduced to less than 1 mile, the Sea Traffic Center will restrict the movement of vessels carrying dangerous cargo.

Vessels over 500 grt carrying liquefied gases and vessels over 3,000 grt carrying dangerous cargo in bulk shall have tugs made fast during entry and exit and during maneuvering to and from the quay, mooring, or anchorage in the zone.

Vessels carrying no dangerous cargo but which exceed either a length of 182.9m, a beam of 26.2m, or a draft of 9.9m shall have a tug made fast when underway in an area, the S limit of which is a line extending 045°/245° through Gjermesholmen Light (59°02.8'N., 9°42.5'E.) and the N limit of which is a line extending 270° through Saltbuodden Light.

The Sea Traffic Center can, when it is considered necessary for safety reasons, order any vessel to use a tug or tugs.

Pleasure craft and open boats, regardless of their size, shall, as far as possible, keep out of the way of large vessels and their service craft.

The speed limit within Langesund Channel between Langoytangen Light (58°59.5'N., 9°45.5'E.) and Figgeskjaer Light, 1.4 miles NNW, is 5 knots.

The speed limit within Brevikfjorden between Figgeskjaer Light (59°01'N., 9°45'E.) and Gjermundsholm Light, 2.3 miles NNW, is 8 knots.

The speed limit within Brevikstrommen between Gjermundsholm Light (59°02.8'N., 9°42.5'E.) and Flauodden Light, 1.5 miles WNW, is 5 knots.

Anchoring.—Vessels can anchor only when it is necessary and permission must first be obtained from the Brevik Sea-Traffic Center. The Traffic Center, for reasons of safety, may order a vessel to go to a designated anchorage. Generally, anchoring, with a few exceptions, takes place only in the following areas and positions:

1. Helgerofjorden, with distances from Amlirogna Light (58°59.5'N., 9°50.3'E.), as follows:
   a. Anchorage A—0.6 mile with the light bearing 060°.
   b. Anchorage B—0.4 mile with the light bearing 046°.
2. Eidangerfjorden: Anchorage C lies N of a line extending E/W from the S point of Orviktangen (59°03.8'N., 9°42.1'E.).
3. Friernaket, with distances from Ringholmen Light (59°05.5'N., 9°37.4'E.), as follows:
   a. Anchorage D—1.1 miles with the light bearing 192°.
   b. Anchorage E—1.1 miles with the light bearing 207°.
   c. Anchorage F—0.9 mile with the light bearing 202°.
   d. Anchorage G—0.9 mile with the light bearing 212°.
   e. Anchorage H—0.7 mile with the light bearing 219°.
   f. Anchorage I—0.9 mile with the light bearing 226°.
4. Herrebukta, with distances from Rafnes Quay No. 3 (59°06.2'N., 9°35.4'E.), as follows:
   a. Anchorage J—0.7 mile with the quay bearing 125°.
   b. Anchorage K—0.4 mile with the quay bearing 125°.

Caution.—Numerous submarine cables and pipelines lie within Langesundsfjorden and may best be seen on the chart.

Several firing areas for coastal artillery are located along the shores in the approaches to Langesundsfjorden. For further details, see Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

Lnagesundsfjorden—Port Facilities

3.3 Numerous small harbors and marinas are located within the Langesundsfjorden area and are used only by fishing vessels, pleasure craft, and local ferries. The principal commercial ports, terminals, and loading berths situated within Langesundsfjorden (Grenland Harbor) are listed below:

1. Langesund (59°00'N., 9°45'E.).
2. Asvall (59°02'N., 9°44'E.).
3. Brevik (59°03'N., 9°43'E.).
4. Porsgrunn (Heroya) (59°08'N., 9°39'E.).
5. Skien (59°12'N., 9°38'E.).
6. Skien Harbour Terminal (59°07.3'N., 9°33.8'E.).
7. Asdalstangen (59°05.0'N., 9°37.7'E.).
8. Rafines (59°06'N., 9°36'E.).

Caution.—Restricted areas, within which navigation is allowed only by prior permission, front the berthing facilities at Heroya (Olje-Nafta), Asdalstangen, and Rafines.

3.4 Langesund (59°00'N., 9°45'E.) is situated along the W side of Langesund Channel. The narrow harbor extends for about 1.5 miles between the mainland and the E side of Langoya. There is a fish processing plant and a ship repair yard. Quays, providing 20 berths, extend along the mainland side of the harbor and have depths of 3.9 to 10.4m alongside. There are facilities for general cargo, ro-ro, and container vessels. Vessels up to 9.1m draft can be handled.

Asvall (59°02'N., 9°44'E.), a fuel terminal, is situated on the SW side of Brevikfjorden (Langesundfjorden), 1.3 miles NNW of Langesund. The berth is 68m long and has depths of 10.6 to 13.2m alongside.

3.5 Brevik (59°03'N., 9°43'E.) (World Port Index No. 23660) stands partly on the mainland and partly on Sylteroya, an island connected to the mainland by a causeway, which lies at the N side of the entrance to Brevikstrommen. The port includes the facilities at Dalbukta and Trosvika, which are situated 0.6 mile NNW and 0.5 mile W, respectively, of Sylteroya.

The port of Brevik extends along the SE shore of the mainland peninsula. It provides 18 berths, with facilities for ro-ro and ferry vessels. The largest is 116m long and has depths of 7.1 to 10.6m alongside. Cargo vessels up to 167m in length and 9.7m draft, and tankers up to 182m in length and 9m draft, can be accommodated.

Dalsbukta provides seven berths. The largest berth, a bulk quay, is situated on the W side of Eidangerfjord. It is 227m long and has depths of 10.3 to 17m alongside.

Trosvika provides four berths. The deepest berth is 31m long and has depths of 7.6 to 17m alongside. The longest berth is 100m long and has depths of 4.6 to 5.8m alongside.

It is reported that a new coal terminal quay is situated at Brevik It is 200m long and has a depth of 15m alongside.

Brevik

Vessels up to 275m in length and 14.2m draft can be handled.

3.6 Porsgrunn (Portgrunn) (59°08'N., 9°39'E.) (World Port Index No. 23670) serves an industrial complex. The harbor extends for about 2.5 miles along the banks of the entrance to the Skien-selva River. The port also includes the deep-water facilities at Heroya, which is situated on the NE shore of Frierfjorden, 1 mile SW. Porsgrunn with Heroya forms Norway's largest industrial complex.

Porsgrunn

Depths—Limitations.—Vessels have to pass under the cable and bridges spanning Brevikstrommen, which have a minimum vertical clearance of 45m. A bascule bridge spans the river at Porsgrunn and has a navigable width of 40m. An overhead cable, with a vertical clearance of 45m, spans the lower part of the Skienselva River.

The river channel is dredged to a depth of 10.5m for about 0.4 mile above the mouth and then to a depth of 9.1m for a farther distance of 0.6 mile.

Porsgrunn provides 44 berths. Dypvannskaya, the deepest berth, is 174m long and has depths of 8.7 to 10.2m alongside. Electrometallurgiske's Quay, the longest berth, is 357m long and has depths of 5.1 to 6.7m alongside.

Heroya provides five berths. The main ones include Hoved-

kaien, the longest berth, which is 560m long and has depths of 9.6 to 13.6m alongside, and Olje-Nafta, the deepest berth, which is 85m long and has depths of 11.5 to 14.7m alongside. Another quay, 174m long, has depths of 7.9 to 9.6m alongside and a ro-ro berth at its head.

The port has facilities for general cargo, ro-ro, tanker, bulk, and chemical vessels. Vessels up to 100,000 dwt and 10.2m draft can be accommodated at Heroya. For the controlling size limitations in the approaches, see Depths—Limitations for Brevikstrommen in paragraph 3.2.

3.7 Skien (59°12'N., 9°37'E.) (World Port Index No. 23680) is situated about 6 miles above the mouth of the Skienselva River, at the head of ocean-going navigation. The harbor extends for about 2 miles along the banks of the river. The port includes Skien Harbor Terminal, which is situated on the N shore of the entrance to Vollsfjorden and is described in paragraph 3.8.

Depths—Limitations.—The bascule bridge spanning the entrance of the river at Porsgrunn has a navigable width of 40m. Overhead cables span the river at various places and have a minimum vertical clearance of 37m. The Menstad Bridge spans the river close below the harbor and has a vertical clearance of 27m over a navigable width of 40m.

The port provides 30 berths. Railway Wharf, the main commercial berth, is 300m long and has depths of 6.7 to 11.9m alongside.

The port has facilities for general cargo, container, and timber product vessels. Vessels up to 85m in length, 14m beam, and 5m draft can be accommodated. Such vessels must be able to pass under the Menstad Bridge.

Aspect.—The entire area along the river, including Skien, is densely built up and backed by hills. A conspicuous church, with two high spires, stands on a hill in the town, N of the river.

Caution.—The current within the river is always setting out at varying rates. The tide is almost unnoticeable. During spring floods or after heavy rain storms, the current at the narrows close S of Skien and at Porsgrunn may attain a rate of 7 to 8 knots. This also occurs with melting ice and snow.

Drifting timbers may be encountered within the river.

3.8 Skien Harbor Terminal (59°07.3'N., 9°33.8'E.) is situated at Slevik, on the N shore of the entrance to Vollsfjorden. It is managed by the Port of Skien.

An overhead cable, with a vertical clearance of 37m, spans the entrance to Vollsfjorden.

The terminal provides two concrete quays, 135m long and 165m long, each with a depth of 11m alongside. The quays are separated by a ro-ro berth, with a depth of 13.3m alongside.

Vessels up to 40,000 dwt, 182m in length, 25.9m beam, and 9.9m draft can be accommodated.

Asdalstangen (59°05.0'N., 9°37.7'E.) is situated on the SW shore of Frierfjorden and serves a petrochemical complex. The main berth is 113m long and has depths of 6.9 to 8.9m alongside, with a ro-ro ramp at its SE end.

Rafnes (59°06'N., 9°36'E.), with four berths, is situated on the SW shore of Frierfjorden and serves an extensive industrial area. The main berth is 64m long and has depths 11.8 to 12.3m alongside. It is extended by mooring dolphins. This berth is mostly used by gas tankers.

Skien Harbor Terminal

Langesundsfjorden to Larviksfjorden

3.9 The coast between Langesundsbukta, in the approaches to Langesundsfjorden, and the entrance to Oslofjorden, about 25 miles ENE, is deeply indented. Many islands, islets, and rocks front the shore and lie up to about 4 miles seaward. Inland, the low terrain as far as Larviksfjorden (59°00'N., 10°05'E.) consists primarily of barren hills. Because these hills consist of light-gray stone backed by dark groups of trees, they tend to merge and produce an impression of monotonous uniformity when seen from a distance to seaward.

Nevlunghamn (58°58'N., 9°52'E.), a small fishing harbor, lies on the E side of the hilly peninsula, which forms the E entrance to Langsundsfjorden. This harbor is fronted by numerous islets, rocks, and shoals which extend up to about 1.5 miles S and 1.7 mile SE of it. Four channels lead between the offlying dangers to the harbor but local knowledge is required. Napa, an islet, lies on a reef, 1.2 miles SSE of the harbor, and is marked by a beacon.

Tvistein Light (58°56'N., 9°56'E.), equipped with a racon, is shown from a prominent building with a tower, 11m high, standing on the easternmost of two islets which lie on a shallow reef. A detached shoal bank, with a least depth of 13m, lies about 1 mile WSW of the light and forms the outermost danger in this vicinity.

Tvistein Light

Several isolated shoal patches, with depths of less than 20m, were reported to lie up to about 2 miles SE of Tvistein Light.

Hummerbakkfjorden (58°58'N., 9°56'E.), a narrow inlet, indents the mainland 2 miles N of Tvistein Light. Its W side is steep-to, its E side is foul, and the head is obstructed by a drying flat. Anchorage is available, exposed to S winds, in a depth of 9m, about 0.5 mile within the entrance of this inlet.

Rakkebane (58°58'N., 10°01'E.), an extensive shallow shoal area, lies 3 miles ENE of Tvistein Light and may best be seen on the chart. It extends S and SSE for about 2 miles from the mainland and is marked on the SE side by a lighted buoy. Several shoal patches, with depths of less than 20m, lie up to about 0.5 mile seaward of the SE end of Rakkebane. In heavy seas the S part of this entire shoal area is covered by breakers.

Svenner Light (58°58'N., 10°09'E.) is shown from a prominent tower, 19m high, standing on an islet within Svennerholmene, a group of low and bare islets lying centered 6.7 miles ENE of Tvistein Light.

Svenner Light

Dypeskaten (58°57'N., 10°08'E.), a detached rocky shoal patch, lies about 1.3 miles SW of Svenner Light. It has a least depth of 15m and is marked at the S side by a buoy. Svennerskaten, a shoal bank with a least depth of 2.5m, lies centered 0.7 mile N of Dypeskaten and about 0.9 mile WSW of Svenner Light. These shoals from the outermost dangers in this vicinity.

Larviksfjorden

3.10 Larviksfjorden (59°01'N., 10°04'E.), a deep fjord, extends about 4.5 miles N from its entrance and is relatively free of dangers. The entrance lies between Rakkebaane, on the W side, and the shoals fronting Svennerholmene, on the E side.

Viksfjorden, a large inlet, extends ENE from the E side of the fjord but is mostly obstructed by islets and shoals. The Langen River flows into the NE side of the fjord and the Farriselva River flows into the head.

Stavernsoya (58°58'N., 9°56'E.), an island resembling a cone, lies close off W side of the fjord, 3.2 miles NW of Svenner Light. Stavernsodden Light is shown from a prominent building, 8m high, standing on the S end of this island.

Ramsholmenflua, a detached group of rocks and shoals, lies close off the E side of Stavernsoya, 0.6 mile NE of Stavernsodden Light. It is marked by a lighted beacon, 9m high, and a buoy. The group forms the outermost danger in this vicinity.

Stavernsodden Light

Molleberget (58°59'N., 10°01'E.), a gray and bare hill, rises on the mainland about 1 mile SW of Stavernsodden Light. It is conspicuous from seaward and may easily be identified against the wooded islets fronting the coast.

3.11 Stavern (59°00'N., 10°02'E.) a small harbor and resort, is situated on the mainland at the W side of the fjord, close NNW of Stavernoya. It is protected by breakwaters and has depths up to 4m. This harbor is used mostly by fishing vessels and pleasure craft.

The war memorial to seaman, a pyramidal building, stands near the mainland shore, about 0.5 mile NW of Stavernsodden Light. This structure is usually prominent but can be difficult to identify at times because its gray color blends with the surrounding landscape.

Stavern War Memorial

Oteroya (59°01.8'N., 10°03.7'E.), marked by a light at the SE side, lies at the E side of the fjord about 2.5 miles NNE of Stavernsodden Light. It is joined by a causeway to the mainland at the N end.

Small craft harbors are situated in the fjord at Vadskjaer (59°02.8'N., 10°02.3'E.) and Ostre Halsen (59°02'N., 10°04'E.).

Tides—Currents.—Generally, currents off the entrance to Larviksfjorden set W and may attain rates of 3 to 4 knots. Currents commonly set seaward through the fjord at rates which vary with the amount of water discharged into the inlet as well as the weather conditions in the Skagerrak.

Pilotage.—Pilotage is compulsory for non-military vessels of 50 grt or over when navigating within the restricted area comprising all of Larviksfjorden and its seaward approaches. Pilots are available from the Grenland/Brevik Harbor (Langesundsfjorden) station. Vessels should send an ETA and arrange pilotage services through Oslofjorden 24 hours in advance (see paragraph 3.1).

Caution.—A coastal artillery firing area (Rakke) and an air target firing area overlap in the seaward approaches to Larviksfjorden. Firing exercise warnings are issued locally and/or by patrol craft which may be present.

3.12 Larvik (59°03'N., 10°02'E.) (World Port Index No. 23700), a commercial port and a major ferry port with links to Denmark, is situated at the head of Larviksfjorden and serves as an industrial center.

Larvik—Kanalen Cargo Terminal

Larvik—Ferry Terminal

Ice.—Ice only forms in the harbor during long cold spells. It is kept open by icebreakers at such times.

Depths—Limitations.—The port provides about 1,300m of main commercial berthage. The principal facilities are described in the table titled **Larvik—Berth Information**.

There are facilities for general cargo, bulk, tanker, ro-ro, and ferry vessels. Vessels up to 196m in length and 9.9m draft can be accommodated.

Aspect.—The town stands around the harbor area at the head of the fjord and a conspicuous church is situated near its center. A light, which indicates the entrance fairway, is shown from the corner of a warehouse standing in the NW part of the harbor near the mouth of the Farriselva River.

Larvik—Berth Information

Pier	Length	Depth
Revkai West	118m	9.0m
Revkai South	70m	10.0m
Revkai Ro-Ro Berth	170m	8.0m
Kanalkaia Nord	335m	10.0m
Kanalkaia West	120m	6.0m
Kanalkaia South	90m	5.0m
West Pier	207m	6.0-8.0m
Fritzoe Kai	140m	5.0-6.3m

Anchorage.—The main anchorage is in depths of 14 to 28m, good holding ground, within Tenvikbukta, the NW part of the harbor area. This roadstead is clear of the entrance fairway and less exposed to S and SW winds.

Anchorage is available, in depths of 40 to 57m, within Jordebukta (59°01.8'N., 10°01.4'E.), a bay lying on the W side of the fjord.

Caution.—A number of outfall pipelines extend seaward from the N and W shores of the harbor area and may best be seen on the chart.

Larviksfjorden to Tonsbergfjorden

3.13 Sandefjorden (59°05'N., 10°15'E.), lying about 6 miles ENE of Larviksfjorden, extends 5.5 miles N. The fairway is deep but it is narrowed in several places by a number of above and below-water dangers that front both sides of the fjord. The surrounding terrain is mostly low and rolling.

Holskjaer Light (Holtskjer) (59°02.3'N., 10°16.1'E.) is shown from a tripod structure standing on an islet at the E side of the entrance to the fjord, 5.5 miles NE of Svenner Light. A group of islets and shoals lies fronts the E side of the entrance and extends for about 0.6 mile SSE of the light.

Leikarhausen, a detached shoal patch with a least depth of 8m, lies in the approach to the fjord, about 0.9 mile S of Holskjaer Light.

Kvernberget (59°04'N., 10°15'E.), a bare and brownish hill, is located 1.9 miles NNW of Holskjaer Light and is conspicuous from seaward. It rises on a small peninsula which is connected to the shore at the E side of the fjord by a low isthmus.

Sydostgrunden (58°59'N., 10°19'E.), a detached group of rocky shoal patches, lies about 3.5 miles SSE of Holskjaer Light. This shallow danger is frequently marked by breakers. The group is marked on its E and W sides by buoys and on its S side by a lighted buoy.

Norde Bondeskaten (58°59'N., 10°16'E.), a shallow rocky shoal, lies about 1.5 miles W of Sydostgrunden and at the E end of a continuous chain of islets and shoals, which extends ENE for 4 miles from the vicinity of Svenner Light (58°58'N.,

10°09'E.) This chain of dangers may best be seen on the chart. Rauer, a group of low islets lying within the chain, is located 2.5 miles ENE of Svenner Light and is reported to be prominent from seaward.

Skipsleia (59°00'N., 10°14'E.) is the outermost of two inner passages, which lead through the off-lying dangers from Larviksfjorden, across the entrance of Sandefjorden, to Tonsbergfjorden. It is used mostly by coastal vessels with local knowledge. The channel, which lies about 1.5 miles from the mainland shore, is comparatively deep. It passes between the dangers fronting the mainland and the chain of dangers extending ENE from Svenner Light.

Batleia, the innermost passage, is commonly used by small craft with local knowledge. It lies close along the mainland shore.

Metfjorden (59°03'N., 10°17'E.) is entered close E of Sandefjorden. This fjord is encumbered by numerous dangers and is of no commercial significance. It is surrounded by comparatively low terrain which is prominent because it rises steeply from the sea. Vegetation is sparse on the E side of the fjord but somewhat more luxuriant on the W side where coniferous forest is found.

The finger of land separating Mefjorden from Sandefjorden is dark gray, low, rocky, and relatively bare.

Ula (59°01'N., 10°11'E.), a small harbor, is situated on the mainland 3.7 miles WSW of Holskjaer Light. This harbor, which is used by small craft, is protected by a mole and has a quay, with a depth of 3m alongside. The outer part provides anchorage, in a depth of 18m. It is exposed to the S and entry requires local knowledge.

3.14 Sandefjord (59°08'N., 10°14'E.) (World Port Index No. 23710), located at the head of Sandefjorden, is a commercial port and ferry terminal which serves a large industrial area.

Ice.—Ice only forms in the harbor during long cold spells. It is kept open by icebreakers at such times.

Tides—Currents.—The tides and currents in the fjord are insignificant. The currents outside the fjord are strongly influenced by wind conditions farther out in the Skagerrak. Generally, they set W and attain maximum rates of 3 to 4 knots.

Depths—Limitations.—The harbor consists of the area lying within 2 miles of the head of the fjord. A number of quays and piers are situated throughout this area.

Thoroya Quay, at the SW side of the harbor, is 150m long and has depths up to 16m alongside. Pier II is 100m long and has a depth of 8m alongside. Frames Quay, at the NE side of the harbor, is 216m long and has depths of 14.7 to 20.5m alongside.

There are facilities for general cargo, bulk, ferry, ro-ro, and cruise vessels. Large vessels with drafts up to 18m can be accommodated.

Aspect.—Asnetset Light (59°06'N., 10°14'E., which indicates the fairway leading to the harbor, is shown from a structure standing on the E side of the fjord, 3.7 miles NNW of Holskjaer Light.

Pilotage.—Pilotage is compulsory for all non-military foreign vessels of 50 grt or over when navigating within the restricted (inner waters) area. Pilots are provided by the Oslofjorden station. Vessels must send an ETA and arrange pilotage services through Oslofjorden 24 hours in advance (see paragraph 3.1). Pilots may be contacted by VHF on channel 16 and 13; generally boarding vessels about 1.5 miles E of Store Faerder Light (59°04.5'N., 10°34.5'E.) or about 3.2 miles SSE of Langoy-tangen Light (58°56.5'N., 9°47.5'E.).

Vessels must also send an ETA to the port through the agent at least 24 hours prior to arrival.

The Port Authority cantact can be mde by:

Telephone: 47 33 456438

E-mail: havnefogd@sandefjord.kommune.no

Website: http://www.sandefjord.no

Anchorage.—Anchorage is available, in depths of 6 to 31m, good holding ground, within the harbor to the N of Asnetset Light.

Directions.—The main approach to Sandefjorden from seaward leads NNW between Sydostgrunden and Norde Bondeskaten, using the white sector of Holskjaer Light. The route leads ENE of Nordosta, a shoal bank with a least depth of 8m lying 0.7 mile NNE of Norde Bondeskaten, and ENE of Leikarhausen. It then continues NW into the entrance of the fjord passing between Holskjaer Light and Koksundbaen, a shallow shoal marked by a buoy, 0.9 mile WSW.

Caution.—A coastal artillery firing exercise area lies in the approaches to Sandefjorden and Mefjorden. It extends up to 7 miles seaward. Firing exercise warnings are issued locally and/or by patrol craft which may be present.

A number of submarine pipelines and cables lie within the harbor and may best be seen on the chart.

Tonsbergfjorden

3.15 Tonsbergfjorden (59°05'N., 10°22'E.) is entered between the E entrance point of Mefjorden and Skatangen (59°03'N., 10°24'E.), the SW extremity of the island of Tjome, about 3 miles E. This fjord, which extends about 14 miles N, is formed by a mainland peninsula, on the W side, and by the islands of Tjome and Notteroy, on the E side.

The seaward approaches to the fjord are encumbered by a myriad of scattered dangers, which may best be seen on the chart. The middle of the fjord is obstructed by several islands, many islets, and a large number of rocks and shoals.

Rocks and shoals extend S for about 2.5 miles from the S extremity of Tjome.

Tonsberg (59°16'N., 10°25'E.) is situated at the head of the fjord and may be approached from seaward or from Oslofjorden by way of Vrengen (59°10'N., 10°25'E.) or the passage and canal lying N of Notteroy. It is fully described in paragraph 3.18.

The narrowed N part of the fjord, extending 3 miles below Tonsberg, is know as Vestfjorden.

Depths in the main passages leading to the head of Tonsbergfjorden are generally quite adequate for ocean-going vessels.

Ice.—Ice forms in Vestfjorden, the N part of the fjord, and in the passage lying N of Nottero. The approach from Oslofjorden is kept open by icebreakers.

Tides—Currents.—The direction and rate of the currents in Tonsbergfjorden are somewhat uncertain because they tend to

fluctuate under the influence of the "Solgangsver," a natural, mostly summertime, phenomenon in which the wind blows from the direction of the sun and consequently shifts in direction as the sun travels from horizon to horizon.

Depths—Limitations.—The least depth in the main approach from seaward to Tonsberg through Tonsbergfjorden is 9m. Vessels with drafts up to 6.4m can use this route. Vessels with drafts up to 5.5m can enter Tonsbergfjorden from Oslofjorden.

Aspect.—Toras (59°04.5'N., 10°24.8'E.), a prominent hill, stands in the S part of Tjome and is 56m high. It appears from seaward as two hills side by side. A conspicuous radio tower is situated 0.2 mile NW of this hill.

Tjome Church (59°06.8'N., 10°23.5'E.) stands in a village 2.5 miles NNW of Toras. Due to its gray color, this church blends in with the land, but from the outer approaches the tower is conspicuous against the skyline.

Tonsberg Tonne Beacon (59°03.5'N., 10°18.6'E.) stands at an elevation of 37m on the W side of the fjord. It is prominent from seaward. Tonsberg Tonne Light and Trubberodden Light are shown from structures situated close S and 0.7 mile NNE, respectively, of this beacon.

Pilotage.—Pilotage is compulsory for all non-military foreign vessels of 50 grt or over when navigating within the restricted (inner waters) area of Tonsbergfjorden. Pilots are provided by the Oslofjorden station. Vessels must send an ETA and arrange pilotage services through Oslofjorden 24 hours in advance (see paragraph 3.1). Pilots may be contacted by VHF and board vessels about 1.5 miles E of Store Faerder Light (59°04.5'N., 10°34.5'E.).

Regulations.—Tonsbergfjorden is situated within the Oslofjord Vessel Traffic Service (VTS) system area. This system is mandatory for all vessels of 24m in length and over and all vessels carrying dangerous cargo. For further details, see paragraph 4.9.

Anchorage.—Tjomekjaela, a narrow passage lying on the E side of Tonsbergfjorden, provides roomy anchorage for small vessels, in depths of 15 to 20m, clay, close S of the Ostre Vakerholmen (59°08.0'N., 10°22.4'E.), an islet marked by a light on its E side.

Directions.—The main approach to Tonsbergfjorden from seaward leads initially NNW between Sydostgrunden (58°59'N., 10°19'E.) and Norde Bondeskaten, using the white sector of Holskjaer Light (59°02.3'N., 10°16.1'E.). When about 3.3 miles from the light, the route turns to a NNE direction and leads through the off-lying dangers, using the lighted range located at Barkevik (59°01.1'N., 10°22.8'E.). The route then continues, from a position located about 0.4 mile SSW of the front range light, in a N direction along the E side of the fjord.

Tonsbergfjorden can also be approached, by small vessels with local knowledge, from the inner passage which leads through the off-lying dangers from Larviksfjorden.

Caution.—A coastal artillery firing exercise area lies in the approaches to Tonsbergfjorden. Firing exercise warnings are issued locally and/or by patrol craft which may be present.

Several submarine pipelines and cables lie within the fjord and may best be seen on the chart.

During stormy weather, the sea breaks over a number of rocky shoals lying within the channels leading through Tonsbergfjorden. At such times, vessels are cautioned not to enter the fjord unless they have accurately determined their position.

3.16 Vrengen (59°10'N., 10°25'E.), the passage leading between the N side of Tjome and Notteroy, connects Oslofjorden to Tonsbergfjorden. This passage, which is narrow and tortuous in places, is mostly used by small vessels with local knowledge in transit between Tonsberg and Oslofjorden.

A fixed highway bridge, which spans the passage 0.5 mile within the W entrance, has a vertical clearance of 33m. Another bridge, located close N of the first one, has a vertical clearance of 28m.

Speed limits are in force within the narrowest parts of the passage. The direction of buoyage in the passage is W to E.

The fairway has several sharp turns and narrows to a width of only 137m in some places.

The currents are generally quite strong in Vrengen and commonly set in a W direction when the current in Oslofjorden is setting to the S. The winds are variable.

Kjopmannskjaer, near the W entrance to the passage, provides 16 berths, some of which are used for lay-up. The largest berth is 45m long and has depths of 6.6 to 9.5m alongside.

The passage can be approached from SE through Leisteinslopet, a channel leading in a NW direction through the off-lying dangers from a position located about 2 miles SE of Leistein Light (59°08.5'N., 10°29.7'E.).

3.17 Huikjela (59°10'N., 10°34'E.) is the principal passage connecting Tonsberg with Oslofjorden. It is the most direct and least encumbered route. The route leads in a NW direction for 6.5 miles through the off-lying dangers from a position located 1.2 miles SW of Hollaenderbaen Light (59°10'N., 10°38'E.). The channel is entered between the islets of Vierskjaera, located 2.6 miles W of the above light, and Store Rauer, 1.2 miles NE.

At the NW end of Huikjela, the route continues through Husoysundet (59°14.5'N., 10°28.0'E.), a passage entered between the NE side of Husoy and the S end of Jersoy (59°14.6'N., 10°28.5'E.). This narrow buoyed passage leads in a WNW direction for 1.5 miles to the E entrance of the Tonsberg Canal. The passage to Tonsberg via this route is limited to vessels with drafts up to 5.5m.

3.18 Tonsberg (59°16'N., 10°25'E.) (World Port Index No. 23720) is located at the head of Tonsbergfjorden. The port serves an industrial area and has a major shipyard.

The harbor area extends along both sides of the passage lying N of Notteroy, which includes the Tonsberg Canal. The port can be approached through Tonsbergfjorden or via passages leading from Oslofjorden.

Depths—Limitations.—A bascule bridge spans the SE part of the Tonsberg Canal. It has a navigable passage, 26m wide, with a depth of 6.7m. The canal consists of a dredged channel with a least depth of 6.5.

Several commercial berths are located SE of the bridge; an extensive shipyard occupies the area on the S side of the harbor NW of the bridge. Numerous small craft moorings front the N side of the harbor close W of the bridge.

The shipyard provides a jetty, 290m long, with depths of 5.6 to 8.5m alongside. There are several drydocks within the harbor; the largest is 150m long and 21m wide, with a depth of

Tonsberg from NW

6.9m on the sill.

Kanalbrygga, the main commercial quay, is located along the N side of the harbor, SE of the bridge. It is 248m long and has depths of 3.6 to 6.7m alongside. A ro-ro berth, with depths of 5.7 to 7.4m alongside, is located close E of this quay.

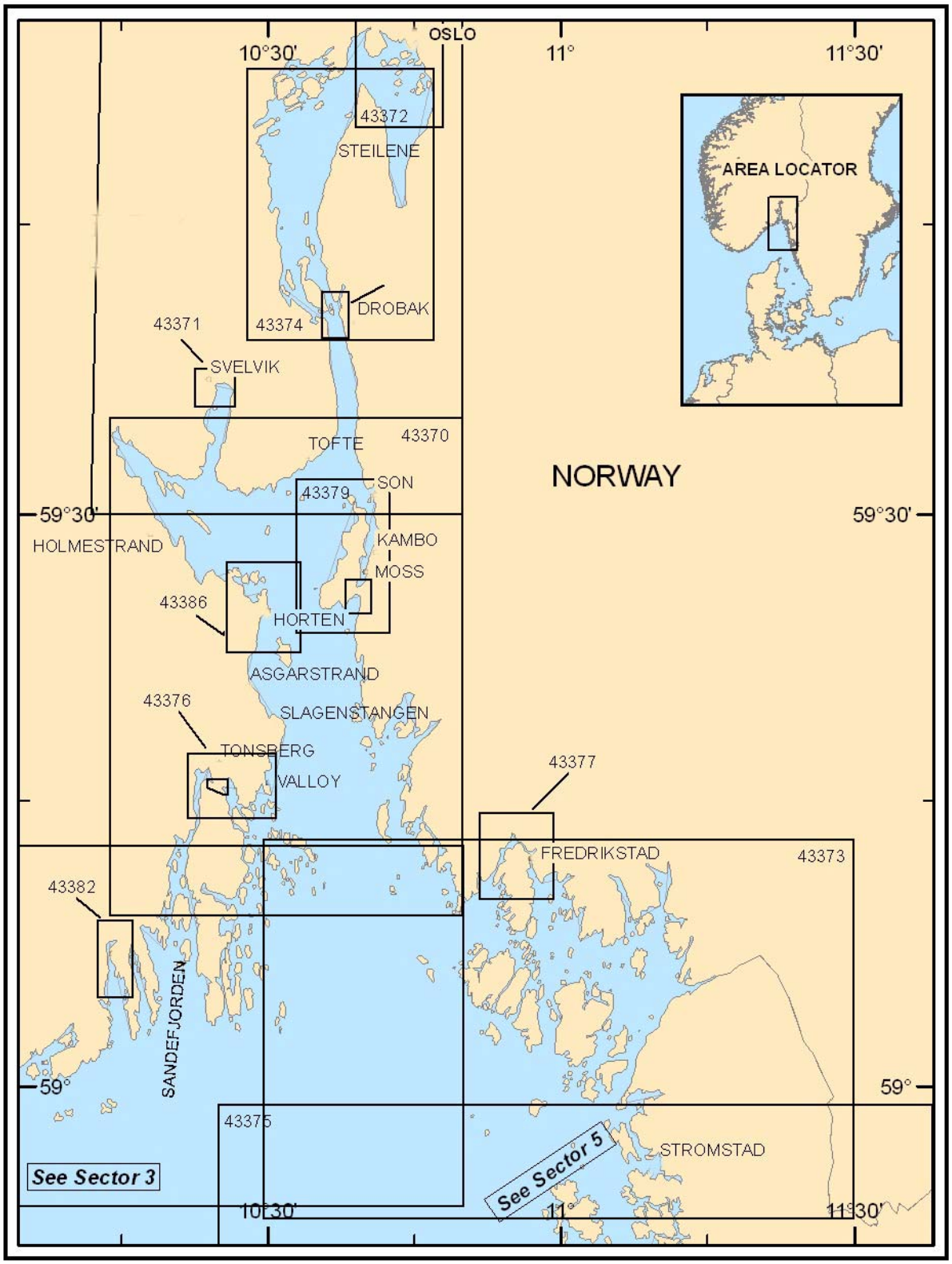
The port has facilities for general cargo, container, ro-ro, and passenger vessels. Vessels up to 14,000 dwt and 6.4m draft can be accommodated.

Aspect.—The fairway within the canal is marked by buoys. A prominent crane and several conspicuous sheds stand in the vicinity of the shipyard, W of the bridge.

Anchorage.—Traela (59°15'N., 10°26'E.), a basin lying close E of the harbor area, provides anchorage, in a depth of 12m, about 0.5 mile SE of the entrance to the canal.

Sheltered anchorage for large vessels is available, in depths of 24 to 26m, mud and clay, near the entrance to Husoysund, about 0.3 mile SE of the S end of Jersoy. It is reported that small vessels anchored in this roadstead are troubled by winds from the E and SE.

Caution.—Several submarine pipelines and cables lie within the harbor area and may best be seen on the chart.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **4** — CHART INFORMATION

SECTOR 4

NORWAY—SOUTHEAST COAST—OSLOFJORDEN

Plan.—This sector describes the SE coast of Norway including Oslofjorden and the approaches, between the S extremity of Tjome and Sekken, a waterway lying about 21 miles ESE. The description is from seaward for Oslofjorden and from W to E for the approaches to Sekken.

General Remarks

4.1 Oslofjorden, the most extensive of all the inlets on the SE coast of Norway, extends inland from its seaward entrance for a distance of 57 miles to Oslo, the principal metropolis and administrative center of Norway. Dramsfjorden, a lesser inlet, branches to the NNW about midway along the W side of Oslofjorden. A large, irregular coastal bight lies at the SE side of the fjord. It is obstructed by a large group of islands, known commonly as Hvaler. Svinesund, Ringdalsfjorden, and Iddefjorden, a continuation, lead ENE and SSE for about 13 miles from the E side of the bight. These fjords extend inland and are shared between Norway and Sweden.

The main harbors of Slagenstangen and Horten lie on the SW side of Oslofjorden, Moss lies on the E side, and Drammen lies at the head of Dramsfjorden. Fredrikstad lies on the N side of the bight indenting the SE side of Oslofjorden and Halden lies at the E end of Ringdalsfjorden.

Oslofjorden differs from the fjords located along the W coast of Norway in that it is shallower and the shores are lower and less precipitous.

Ice.—Ice occurs throughout Oslofjorden, particularly during January and February. Generally, the channels leading to Oslo and the other main ports are kept open by icebreakers. During severe winters, the entire fjord may freeze. When this occurs with strong S winds, drift ice from the Kattegat may be forced into the fjord. This condition may halt all navigation for a short period.

Tides—Currents.—Currents from the Kattegat set N along the Swedish coast as far as the Kosteroarna Islands, where they swing NW, set across the entrance to Oslofjorden, and continue on down the Norwegian coast. These currents may attain a maximum rate of over 1 knot during gales from the E.

Currents within Oslofjorden are variable and largely influenced by meteorological conditions. The general flow is usually outgoing, especially when the rivers are in flood.

Aspect.—The hills on both sides of Oslofjorden are generally covered by fir and pine trees. The trees are interspersed with clear patches containing farms, which can be identified by groups of buildings. In the section extending up to about 15 miles below Oslo, the shores of the fjord become steeper and there are more areas of cultivation and deciduous trees. The inland hills are distinctive and numerous houses stand on the low land.

Bjornerodpiggen (59°01'N., 11°25'E.), the tallest elevation rising on the E side of the fjord area, is formed by the prominent summit of Loverasfjallet mountain. It is 222m high and generally is the first landmark to be seen from seaward during clear weather. Also prominent is Dragonkullen, a hill 168m high, which stands 6 miles NNW of Bjornerodpiggen.

The **Kosteroarne Islands** (58°53'N., 11°02'E.), a group lying on the SE side of the entrance to the fjord, are often seen from seaward before the higher inland elevations during periods of poor visibility.

Vagnarbergen (59°02'N., 11°09'E.), a range of hills rising to a height of 120m, stands on the Swedish coast and is usually visible from up to 20 miles seaward.

Bankerodkollen (59°06'N., 10°54'E.) is 72m high and, along with Skjelsbuveten 0.4 mile SSE, forms the summit of the island of Vesteroy. These two points may easily be identified from SW by the gap between them. They are also the highest elevations of Hvaler, the group of islands fronting the mainland in this vicinity.

Pilotage.—The waters and ports described in this sector lie within the Oslofjorden (Horten) Pilot Booking Center Area, which extends E from Egersund (58°27'N., 6°00'E.) to the Swedish border. All vessels must send an ETA and arrange pilotage services through Oslofjorden Pilot Booking Center 24 hours prior to arrival. The practice of requesting pilots through the local stations has been discontinued. For further details, see paragraph 4.9 and Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

Regulations.—Sea Safe Net (SSN) is a mandatory reporting system operated by the Norwegian Coastal Administration for all vessels entering Norwegian ports. For further details, see Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

Oslofjorden lies within the restricted inner (internal) waters of Norway. Entry of foreign commercial vessels into the inner (internal) waters is subject to certain regulations and procedures. For further details, see Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

Special recommendations concerning routes applying to tankers of 40,000 dwt and over navigating along the coast and approaching Oslofjorden are described in paragraph 1.1.

Caution.—Numerous firing exercise areas are situated in the approaches to Oslofjorden and extend up to about 30 miles seaward. Warnings are disseminated by local notice to mariners and coastal radio stations. For further details, see Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

Numerous submarine cables and pipelines, which may best be seen on the chart, lie within the fjord and connect the islands to the mainland. Vessels should be aware that where pipelines are located close together, only one may be charted. In addition, some pipelines are located above the sea bed and their presence may effectively reduce the charted depth by as much as 2m.

In Norwegian waters, some submarine power cables may conduct high voltages; contact with or being close to them may

pose a danger. Vessels should also be aware that some of these cables in the inner waters may not be charted.

Depths within the central part of Oslofjorden are deep but very uneven. They may vary by as much as 200m over a distance of only 0.5 mile.

Drift-net fishing for mackerel and salmon is carried out off the entrance to Oslofjorden between May and August.

Purse net and land net fishing is carried out within Oslofjorden between June and September.

Oslofjorden—Central Passage

4.2 Numerous small islands, islets, and rocky shoals front both sides of Oslofjorden and may best be seen on the chart.

Lille Faerder (59°02'N., 10°31'E.), a group of islets also known as Tristeinane, lies on the SW side of the approach to Oslofjorden. Faerder Light, equipped with a racon, is shown from a prominent tower, 43m high, standing on the middle islet.

Faerder Light

Tristeingrund, a detached shoal, lies at the S end of a bank, about 0.8 mile SSW of the light. It has a least depth of 1m and is marked by a buoy. A number of isolated shoal patches, with depths less than 5m, are reported to lie up to 0.7 mile S of this buoy. These isolated shoals form the outermost dangers in this vicinity.

Store Faerder (59°04'N., 10°32'E.) is a bare, dark gray island lying 2 miles N of Faerder Light. It can easily be identified by a deep cleft on the S edge, which is visible from E and W. A light is shown from a structure standing on the N end of this island. A number of islets and shoals lie between the S end of the island and Lille Faerder.

Laksjera Light (Laksskjaer) (59°03'N., 10°28'E.) is shown from a tripod structure, 10m high, standing on an islet lying 2.3 miles NW of Faerder Light, at the SE edge of the dangers fronting the S end of Tjome.

Torbjornskjaer Light (59°00'N., 10°47'E.) is shown from a prominent building with a tower, 18m high, standing on an islet lying on an extensive shoal bank. Shoals, with depths of less 20m, extend up to about 1 mile SW, 1 mile W, and 1.8 miles N of the light.

Nordre Stroregrunn, a detached shoal bank, lies about 4.3 miles NW of Torbjornskjaer Light and has a least depth of 29m.

Torbjornskjaer Light

Trestenene Light (59°02'N., 10°54'E.), equipped with a racon, is shown from a structure standing on a group of rocks, 4 miles NE of Torbjornskjaer Light.

4.3 **Struten Light** (59°07'N., 10°44'E.) is shown from a structure, 13m high, standing on an islet lying on a shallow bank, 7.4 miles NNW of Torbjornskjaer Light. A disused lighthouse building with a tower, 14m high, is situated close to the light and is conspicuous from seaward.

Struten Light (with disused lighthouse)

Sostrene, consisting of two small islands lying on a reef, is centered about 1 mile SE of Struten Light. The islands are 34 to 40m high and are distinctive due to their dark brown color.

Hoka, a detached shoal with a least depth of 25m, lies about 1.9 miles SW of Struten Light and forms the outermost danger in this Vincent.

The main entrance of Oslofjorden lies between the S extremity of Tjome and Torbjornskjaer Light, 8 miles ESE, and is wide. The fjord extends about 25 miles N and then decreases to a width of only 2 miles.

4.4 **Hollenderbaen Light** (59°10'N., 10°38'E.), equipped with a racon, is shown from a prominent column, 18m high, standing on a shoal lying 8.5 miles NNE of Faerder Light, at

Hollenderbaen Light

the E edge of the dangers fronting Notteroy. The shoal is marked by breakers during S gales.

Fulehuk Light (59°11'N., 10°36'E.) is shown from a structure standing, at an elevation of 9m, on an islet lying on a reef, 1.3 miles NW of Hollenderbaen Light

ht. A disused lighthouse building, with a tower 15m high, is situated close S of the light and is conspicuous from seaward.

Fulehuk Disused Lighthouse

Stromtangen Light (59°09'N., 10°50'E.) is shown from a column structure, 8m high, standing on the S end of an islet lying close off the mainland, 3.4 miles NE of Struten Light. A disused lighthouse building, with a tower, is situated close to light and is conspicuous from seaward.

Sondre Missingen (59°10'N., 10°43'E.), the largest island of a group, lies on a reef, 3.9 miles WNW of Stromtangen Light, and is marked by a prominent beacon.

Veslekalv Light (59°15'N., 10°42'E.) is shown from a structure, 3m high, standing on an islet lying close off the N end of Rauer, 6 miles NNE of Hollenderbaen Light.

Medfjordbaen Light (59°20'N., 10°34'E.), equipped with a racon, is shown from a column, 14m high, standing on rocky reef, 10.7 miles NNW of Hollenderbaen Light.

Stromtangen Light (with disused lighthouse)

Medfjordbaen Light

Bastoy Light (with disused lighthouse)

4.5 Bastoy Light (59°23'N., 10°32'E.) is shown from a structure standing on the NE end of Bastoy, an island lying 3 miles NNW of Medfjordbaen Light. A disused lighthouse building with a tower, 14m high, is situated close SW of the light and is conspicuous from seaward.

Bastoy is flat and prominent from S due to its dark forested color. It is also prominent from E due to the isthmus which separates the N part from the S part of the island.

Revlingrevet Light (59°24'N., 10°38'E.) is shown from a structure standing on the NW side of an islet lying on a reef, close off the E side of the fjord, 3 miles ENE of Bastoy Light.

Gullholmen Light (59°26'N., 10°34'E.) is shown from a structure, 8m high, standing on the W side of an islet lying on a reef, close off the E side of the fjord, 3.1 miles NNE of Bastoy Light. A disused lighthouse building with a tower, 9m high, is situated close to the light and is conspicuous from seaward.

Gullholmen Light (with disused lighthouse)

Molen Light (59°29'N., 10°30'E.) is shown from a structure standing on the SW side of an islet, 3.7 miles NW of Gullholmen Light. This islet lies at the S end of a narrow reef which extends about 2.5 mile S from the S side of Hurum.

Ostnestangen Light (59°31.2'N., 10°30.6'E.) is shown from a structure standing on the S end of a small peninsula, 2.3 miles NNE of Molen Light. Ramvikholmn, an islet marked on its NW side by a light, lies on a detached reef about 0.7 mile E of Ostenestangen Light. Tofteholmen, an islet 32m high, lies 0.7 mile ESE of Ramvikholmn.

Filtvet Light (59°34'N., 10°37'E.) is shown from a structure, 14m high, standing on the SE side of Hurum, 8.3 miles NNE of Gullholmen Light. A disused lighthouse building with a tower, 14m high, is situated close to the light and is conspicuous from seaward.

Filvet Light (with disused lighthouse)

4.6 Elle Light (59°38'N., 10°38'E.) is shown from a structure standing on the E side of the fjord, 4.2 miles NNE of Filvet Light.

Nordre Kaholmen Light (59°40.7'N., 10°36.5'E.) is shown from a structure standing on the E side of a small island of the same name, 2.5 miles N of Elle Light. Sondre Kalholmen, another small island, lies close S of Norde Kalhomen and is connected to it by a very narrow isthmus.

Smaskjera, consisting of two above-water rocks, lies on the SE edge of a shallow rocky ridge, 0.8 mile S of Norde Kalhomen Light, and is marked by a buoy. The shoal ridge extends 0.3 mile W from the rocks to the W shore of the fjord and 0.4 mile NNW from the rocks to the S end of Sondre Kalholmen. A detached shoal patch, with a least depth of 10m, lies close NNE of Smaskjera.

Drobakgrunnen, a detached rocky shoal, lies about 0.2 mile off the E side of the fjord, about 0.3 mile ENE of Smaskjera. It has a least depth of 4.6m and is marked by a lighted buoy, on the W side, and a buoy, on the NE side.

4.7 Langebat Light (59°41.2'N., 10°36.4'E.) is shown from a structure standing on a reef lying close off the E side of the fjord, 0.5 mile N of Norde Kalhomen Light.

Range lights are shown from structures standing at Tronstadodden, at the E side of Haoya, about 0.9 mile NW of Norde Kalhomen Light. Batsto Lighted Beacon is situated on a reef close off the E side of the fjord, 0.4 mile ENE of these range lights.

Askholmane Light (59°42.2'N., 10°35.5'E.) is shown from a structure standing on the N end of an islet lying 1.1 miles NNW of Langebat Light. This islet is the eaternmost of a group of islets lying on a shallow bank near the middle of the fjord.

Storegrunnen Light (59°42.6'N., 10°35.3'E.) is shown from a structure standing on a detached shoal patch, 0.4 mile NNW of Askholmane Light.

Storegrunnen Light

Digerudgrunnen Light (59°43.2'N., 10°35.2'E.) is shown from a column, 8m high, standing on a shoal bank at the E side of the fjord, about 0.6 mile N of Storegrunnen Light.

Aspond Light (59°43.5'N., 10°34.7'E.) is shown from a structure standing on the SE side of a small island, 0.4 mile NW of Digerudgrunnen Light.

Nordre Sundbyholmen Light (59°43.6'N., 10°32.1'E.) is shown from a structure standing on an islet at the W side of the fjord, 1.6 miles WNW of Digerudgrunnen Light.

Digerudgrunnen Light

Spro Light (59°45.7'N., 10°34.9'E.) is shown from a framework structure standing at the E side of the fjord, 2.5 miles N of Digerudgrunnen Light.

Langara Light (59°45.4'N., 10°34.0'E.) is shown from a structure standing on the E side of a small island, about 0.6 mile SW of Spro Light.

4.8 **Steilene Light** (59°49.0'N., 10°35.6'E.) is shown from a column, 9m high, standing on the SW end of an islet of the same name, about 3.3 miles N of Spro Light. A building, the former dwelling of the lighthouse keeper, is situated close to the light. The islet, which is also marked by a light at its N end, lies within a group of dangers which extend up to about 1 mile from the E shore of the fjord.

Steilene Light

Sondre Steilesand, a detached shoal patch, lies 0.6 mile SW of Steilene Light. It has a least depth of 8.3m and is marked by a buoy.

Storegrunnane, a rocky shoal patch, lies about 0.6 mile W of Sore Steilesand and has a least depth of 13.5m.

Ostre Masane (59°49.5'N., 10°35.0'E.), a group of shoals, lies centered about 0.6 mile NW of Steilene Light and is marked by a buoy.

Bjorkoygrunnen Light (59°49.9'N., 10°31.6'E.) is shown from a structure standing on a reef at the W side of the fjord, 2.3 miles WNW of Steilene Light.

Gasungane Light (Gassungene) (59°50.4'N., 10°35.2'E.), equipped with a racon, is shown from a tripod structure standing on a partly drying reef, about 1.4 miles NNW of Steilene Light. The S end of the reef is marked by a buoy and a beacon is situated close E of the light.

Gasungane Light

Gasoya Light (59°51.1'N., 10°35.3'E.) is shown from a structure standing on Arnesflua, a rock lying close off the SE side of Gasoya Island, about 0.7 mile N of Gasungane Light.

Illjernsflua Light (59°51.3'N., 10°37.9'E.) is shown from a structure, 14m high, standing on a detached shoal, 1.3 miles ENE of Gasoya Light.

Illjernsflua Light

Nesodtangen Light (59°59.3'N., 10°39.4'E.) is shown from a tripod structure, 5m high, standing on a rock lying close off the N side of Nesodden, 1.2 miles NE of Illjernsflua Light.

Storesanden, a detached shoal bank, lies about 0.9 mile WSW of Nesodtangen Light and has a least depth of 12.5m.

Tangegrunnane, a group of detached rocky shoals, extends up to about 0.5 mile N of Nesodtangen Light.

Oslofjorden

4.9 The main route for shipping in the S and central parts of Oslofjorden, although narrow in places, presents no difficulties by day or at night. However, it is recommended that large vessels navigate the route through the fjord to the N of Drobak (59°40'N., 10°38'E.) only during daylight.

Major Harbors in the fjord:

1. Horten (59°25'N., 10°29'E.) an industrial center.
2. Moss (59°26'N.,10°40'E.) a commercial/industrial town.

3. Oslo Havn (59°54'N., 10°44'E.) the principal harbor in Norway.
4. Drammen (59°44'N., 10°14'E.) commercial/industrial center.

Depths—Limitations.—The main route leading through the fjord has a least depth of 15m, which lies on a bank close W of Drobakgrunnen (59°40.0'N., 10°37.2'E.).

Pilotage.—Pilotage within Oslofjorden is compulsory for vessels of 500 grt and over and all vessels, irrespective of size, carrying dangerous and/or polluting cargo.

Vessels should send a request for pilotage 24 hours in advance to the Oslofjorden (Horten) Pilot Booking Center by fax, telephone, or VHF channel 13. The message should include name, call sign, nationality, ETA, destination, draft, brief details of cargo, tonnage, length, beam, and any other information as appropriate. Requests can be sent via the agent.

Vessels should then send a confirmation of the request for pilotage and an ETA 5 hours and 2 hours prior to arrival.

Generally, pilots board vessels about 1.5 miles E of Faerder Light (59°04.5'N., 10°34.5'E.), within a designated boarding area.

For further details, see paragraph 4.1 and Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

Regulations.—A Vessel Traffic Service (VTS) operates in Oslofjorden and its approaches.

The seaward limit of the VTS area consists approximately of, on the W side, a line extending S from Tonsberg Tonne Beacon (59°03'N., 10°19'E.) and, on the S side, latitude 58°57'N.

The VTS area is divided into two sectors:

1. Sector 1, lying S of 59°48'N, is operated by Horten VTS Control Center.
2. Sector 2, lying N of 59°48'N, is operated by Oslo Port VTS Control Center.

The following vessels must participate in this system:

1. All vessels 24m and over in length.
2. All vessels carrying hazardous and/or polluting cargo in bulk.
3. All vessels within Sector 2 carrying paying passengers.

The following frequencies are used:

1. Sector 1 (S of Hollenderbaen Light)—VHF channel 18.
2. Sector 1 (N of Hollenderbaen Light)—VHF channel 19.
3. Sector 2—VHF channel 80.

Contact:

Horten VTS
http://www.kystverket.no/?did=9103236
E-mail: horten.vert@kystverket.no

Oslo VTS
http://www.oslohavn.no/english
E-mail:
postmottak@havnevesenet.oslo.kommune.no

All vessels, except those carrying dangerous goods, must send a report 1 hour before entering into the VTS area to the appropriate Control Center by VHF, e-mail, or fax. Vessels carrying dangerous goods must send a report 6 hours before entry. The reports must include the vessel name, call sign, IMO identification number, position, destination, intended route, and ETA at the pilot boarding place.

Clearance to enter the VTS area must be obtained from the Horton VTS Control Center; clearance must also be obtained to anchor within the area.

All vessels must then report to Horton Control Center on VHF channel 18 when entering or leaving the VTS area.

Ferries operating local transits are only required to report immediately before leaving the berth.

When transiting the area or at anchor, vessels must keep a continuous watch on the designated frequency.

VTS communications shall be in English or a Scandinavian language.

Permission to change frequencies or end a VHF watch must be obtained from the VTS Control Center.

VTS operations, traffic information, or clearances do not relieve the Master of the responsibility for safe navigation of the vessel.

Vessels with drafts over 9.1m are not permitted to navigate N of Drobak (59°40'N., 10°38'E.) at night.

Tankers proceeding to oil installations situated N of Drobak (59°40'N., 10°38'E.) are permitted to have a maximum draft of 9.1m at night and a maximum draft of 11m by day.

Tankers exceeding 35,000 dwt are not permitted to pass Drobak when loaded.

Tankers exceeding 10,000 dwt, when navigating between Filtvet Light and the oil installations in the inner part of Oslofjorden, are required to display the appropriate signals for vessels constrained by their draft.

In addition, tankers may use a sound signal, consisting of one long blast followed by two short blasts, at night or by day.

Anchoring, fishing, and diving are prohibited within an area, which may best be seen on the chart, extending between Drobak and Norde Kalhomen Light (59°41'N., 10°37'E.).

Directions.—A Traffic Separation Scheme (TSS), which may best be seen on the chart, is situated in the entrance to Oslofjorden and lies centered 2.3 miles SE of Faerder Light (59°02'N., 10°31'E.). The inbound traffic lane is located on the SE (outer) side of the separation zone and the outbound lane is located on the NW (inner) side.

From the N end of the inbound traffic lane, the main route through Oslofjorden leads in a N direction for about 8 miles, using the white sector of Hollenderbaen Light (59°10'N., 10°38'E.). It passes E of Store Faerder Light (59°04'N., 10°32'E.) and W of Struten Light (59°07'N., 10°44'E.).

An extensive Traffic Separation Scheme (TSS), which may best be seen on the chart, extends NNW from the vicinity of Hollenderbaen Light to the vicinity of Gullholmen Light (59°26'N., 10°34'E.). The inbound traffic lane lies on the E side of the separation line. The scheme passes ENE of Fulehuk Light, Medfjordbaen Light, and Bastoy Light, and WSW of Sondre Misingen (59°10'N., 10°43'E.) and Revlingrevet Light.

From W of Gullholmen Light, the TSS continues in a NNE direction to the vicinity of Filvet Light (59°34'N., 10°37'E.). It passes ESE of Molen Light, Ostnestangen Light, and Tofte-

holmen. From E of Filvet Light, the TSS continues in a N direction to the vicinity of Elle Light (59°38'N., 10°38'E.).

There are a number of alternate routes in the N part of the fjord, which may best be seen on the chart. Alternate secondary tracks lead W of Askholmane (59°42'N., 10°35'E.), W of Aspond (59°44'N., 10°34'E.), W of Langara (59°45'N., 10°34'E.), and SE of Gasungane Light. However, only the main route is described below.

The main route continues N from E of Elle Light to the vicinity of Drobak (59°40'N., 10°38'E.). It then leads in a NNW direction and passes between Smaskjera, on the W side, and Drobakgrunnen, on the E side.

The track continues in a NNW direction and is adjusted to pass close E of Norde Kalhomen Light, WSW of Langebat Light, ENE of Tronstadodden Range Lights, WSW of Batsto Lighted Beacon, ENE of Askholmane Light, ENE of Storegrunnen Light, and WSW of Digerudgrunnen Light (59°43.2'N., 10°35.2'E.).

The track then leads in a N direction to the vicinity of Gasungane Light (59°50.4'N., 10°35.2'E.). It is adjusted to pass E of Aspond Light, E of Langara Light, W of Spro Light, W of Sondre Steilesand, E of Storegrunnan, W of Steilene Light (59°49.0'N., 10°35.6'E.), and W of Ostre Masane.

The route passes close W of Gasungane Light and then leads in a NE direction to the vicinity of Nesodtangen Light (59°59.3'N., 10°39.4'E.), in the approaches to Oslo. It passes SE of Gasoya Light, NW of Illjernsflua Light, and SE of Storesanden.

A small TSS, which may best be seen on the chart, lies 0.4 mile W of Nesodtangen Light and is marked by a buoy at the N end.

Caution.—The section of the route extending between the N end of the Traffic Separation Scheme (TSS), located in the vicinity of Elle Light (59°38'N., 10°38'E), and the TSS located W of Nesodtangen Light (59°59.3'N., 10°39.4'E.) is designated as a Precautionary Area. All vessels must navigate with extreme caution when passing though this narrow area.

Waterway regulations in Norwegian internal (inner) waters differ from those in 72 COLREGS. Details of these regulations should be obtained locally.

The Traffic Separation Schemes (TSS) located in Oslofjorden are not IMO-adopted. However, the Norwegian government advises vessels that Rule 10 of the 72 COLREGS applies.

Explosive dumping ground areas, which may best be seen on the chart, lie centered 3 miles S and 2.8 miles NNE of Medfjordbaen Light (59°20'N., 10°34'E.).

A number of anchorages, which may best be seen on the chart, lie within the shallower parts of the fjord and adjacent coves. Generally, local knowledge is required and foreign vessels should consult the pilot.

Oslofjorden—West Side

4.10 Between Helgerodtangen, the S extremity of Tjome, and Horten, about 21 miles N, the W side of the fjord is divided into two distinct parts. The S part consists of an intricate complex of islands, islets, rocks, and waterways, including the heavily populated islands of Tjome and Notteroy. The N part, by contrast, consists of a forested segment of the mainland coast, which falls off in a gentle slope toward the fjord.

Several passages, available to smaller vessels with local knowledge, lead through the many off-lying dangers situated within the S part of this area and then into the entrance of Oslofjorden. The main passages are Rossesundet (59°04'N., 10°26'E.), Sandoysundet (59°04'N., 10°28'E.), and the channel leading W of Store Faerder.

Huikjela (59°10'N., 10°34'E.) is the principal passage connecting Tonsberg with Oslofjorden. It is the most direct and least encumbered route. The route leads in a NW direction for 6.5 miles through the off-lying dangers from a position located 1.2 miles SW of Hollaenderbaen Light (59°10'N., 10°38'E.). The channel is entered between the islets of Vierskjaera, located 2.6 miles W of the above light, and Store Rauer, 1.2 miles NE. For further details, see paragraph 3.17

Leisteinlopet (59°08'N., 10°32'E.) is the most direct approach to Vrengen from seaward. It leads in a NW direction through the off-lying dangers from a position located about 2 miles SE of Leistein Light (59°08.5'N., 10°29.7'E.). Vessels can then reach Tonsbergfjorden via Vrengen.

Veten (59°10'N., 10°26'E.), the summit of Notteroy, rises in the SE part of the island to a height of 99m. This hill is conspicuous from the E. Slottsfjelltarnet, a tower standing in the W part of Tonsberg, is conspicuous from SE, but is obscured on some bearings.

4.11 **Valloy** (Vallo) (59°16'N., 10°30'E.) the site of an oil refinery and a large tank farm, is situated on a peninsula, which forms the NE side of Valloy-bukta, a small bay. An extensive industrial complex stands at the SW side of this bay on the NE side of Jersoy.

Three quays front the inner side of the peninsula, considered to be part of the port of Tonsberg. The largest berth, which is situated on the NW side of the southernmost quay, is 82m long and has depths of 8.3 to 10.1m alongside.

Vessels may anchor within Valloybukta, N of a submarine pipeline, in depths of 13 to 15m, clay, about 0.2 mile WNW of the quays.

The bay may be approached directly from Oslofjorden through Torgersogapet or via Hiuljela (59°10'N., 10°34'E.). Torgersogapet, which has a least depth of 5.5m, leads W from the fjord. It passes between the S end of the peninsula and the N side of Torgersoy Island, which is marked by a light.

4.12 **Slagenstangen** (59°19'N., 10°32'E.) (World Port Index No. 23736), a point located on the W shore of Oslofjorden about 3.5 miles NNE of Valloy, is the site of an oil refinery and terminal. The terminal is managed by Norske ESSO and considered to be part of the port of Tonsberg.

Tides—Currents.—The current usually sets SE across the face of the jetty. If the wind velocity reaches 25 knots or the current attains a rate of 0.7 knot, as determined by the instruments at the terminal, vessels should prepare to get underway.

Depths—Limitations.—The approach to the terminal has a least depth of 25m. The jetty extends about 0.3 mile N from the shore and provides three berths. The largest berth, located at the E side, has a depth of 21m alongside.

Tankers up to 250,000 dwt, 350m in length, and 20.1m draft can be accommodated. Tankers (VLCCs) up to 285,000 dwt can be handled with drafts up to 18.2m.

Aspect.—The approach to the jetty is marked by a lighted buoy and a lighted range.

Regulations.—Tankers of 20,000 dwt and over, carrying crude oil or black oil, must be escorted by a tug while navigating in the fjord to and from Slagenstangen.

Vessels should send an ETA to the terminal 72 hours, 48 hours, 24 hours, and 12 hours in advance.

Anchorage.—Three anchorage areas, which may best seen on the chart, lie centered about 0.6 mile N of the jetty. They have depths of 50 to 60m and are designated A, B, and C.

Asgardstrand (59°21'N., 10°28'E.), an extensive small craft harbor with three basins, is located about 2 miles NW of Stagenstangen.

Horten (59°25'N., 10°30'E.)

World Port Index No. 23750

4.13 Horten, serving an industrial area, is located 6 miles NNW of Slangenstangen Terminal. The port is divided into outer and inner harbors. The inner harbor, an enclosed bay, lies N of the town and Karljohansvern is situated on its E side. This harbor contains a naval base and the headquarters of the Royal Norwegian Navy is located at Karljohansvern.

The outer, or commercial, harbor is situated E of the town and extends along the W side of Bastoyrenna, the channel leading W of the island of Bastoy (59°23'N., 10°32'E.).

Horten from N

Tides—Currents.—The normal tidal range is 0.3m, but the water level can be strongly influenced by meteorological conditions. In the area N of the port, the current generally sets S and in the entrance to the inner harbor may attain a rate of 2 knots at springs.

Depths—Limitations.—The outer harbor provides about 410m of quayage with 14 berths.

A narrow jetty, situated close S of Horten Light, projects about 200m from the shore and serves a tank cleaning plant. It has depths up to 10.8m alongside and can accommodate tankers up to 100,000 dwt for tank cleaning.

Dypvannskaia, situated 0.2 mile SW of Horten Light, is 140m long and has depths of 7.6 to 8.5m alongside. This quay provides a ro-ro ramp at its SW root.

Hortensbrygge projects from the shore 0.4 mile SW of Horten Light. This quay provides 200m of berthage, with depths of 3 to 5m alongside, and is used mostly by local ferries.

The harbor has facilities for general cargo, ro-ro, and ferry vessels. Vessels up to 175m in length and 8m draft can be accommodated.

The inner harbor provides eight berths. The largest is Horten Verft, which is 359m long and has depths of 4.3 to 8.2m alongside. The shipyard provides two drydocks. The largest is 244m long and 34m wide. It can handle vessels up to 60,000 dwt and 7.5m draft.

It is reported that commercial vessels may undergo repairs at the naval shipyard within the inner harbor. Such vessels must enter only with prior permission and under the control of a naval pilot.

Fyllingen, entered close N of Horten Light, is a small craft basin. It is connected to the inner harbor, by a shallow canal.

Aspect.—Horten Light is shown from a structure standing on the head of a breakwater, 2.1 miles NW of Bastoy Light (59°23'N., 10°32'E.). A church, with a prominent spire, stands in the E part of the town.

Regulations.—All foreign commercial vessels are prohibited from approaching or entering the inner harbor. Due to this regulation, no description of the inner harbor is given.

Unauthorized approach within 50m of the shore is prohibited in the area surrounding the inner harbor.

Anchorage.—Anchorage is available, in depths of 20 to 43m, sand and clay, about 1.3 miles SE of Horten Light. The holding ground is good, but strong winds from S and E cause a considerable sea in this area.

Anchorage can also be taken in depths of 16 to 25m, sand, about 0.4 mile NNW of Bastoy Light or in depths of 16 to 20m, sand, about 0.3 mile NNE of Bastoy Light.

Anchorage is available, in depths of 13 to 15m, sand and clay, about 0.4 mile NE of the entrance to the inner harbor.

Caution.—Hortenskrakken, a detached drying shoal bank, lies about 0.5 mile NE of Horton Light and is marked by buoys.

4.14 **Tofte** (59°33'N., 10°34'E.) (World Port Index No. 23823) is located on the SE side of Hurum, 2 miles SW of Filvet Light. This small harbor, which is protected by a mole, serves a wood pulp and cellulose factory. There are eight berths. The largest is 102m long and has depths of 10.3 to 12.3m alongside. A mooring buoy is situated in the E part of the harbor.

Sagene (59°32'N., 10°32'E.), located 1.3 miles SW of Tofte, serves a cellulose factory. There is a quay, 153m long, with depths of 4.3 to 7.9m alongside.

The chimneys of the factories standing at the above loading places are conspicuous from seaward.

4.15 Oslofjorden opens to the W between Horten and the S coast of Hurum, a large peninsula, about 4 mile N. This broad opening consists of a somewhat encumbered basin, which gradually decreases in width. Inland, the terrain is forested and quite hilly. The coasts rise with comparatively steep slopes from the water's edge.

Several small craft harbors and marinas are situated along the shores of the basin. Dramsfjorden extends N for about 15 miles from the N side of this basin.

Breidangen, a water area, lies N of Horten and forms the approach to the entrance to Dramsfjorden. A deep channel leads from Oslofjorden into this area and passes S of Molen Light (59°29'N., 10°30'E.).

Anchorage is available, in depths of 21 to 32m, sand, about 0.5 mile E of Molen Light.

Mulodden Light (59°29'N., 10°21'E.) is shown from a structure standing on the N end of a small promontory extending N from the W side the basin, 4.5 miles W of Molem Light.

Langoya (59°30'N., 10°23'E.), the site of a limestone quarry, lies 1.2 miles NE of Mulodden Light. This elongated island is located at the SE end of a group of islands that encumber the inner part of the basin. Four berths and a ro-ro ramp are situated at the SW side of the island. The largest is 56m long and has depths of 5.5 to 6.1m alongside. Landing is prohibited on the island.

Holmestrandsfjorden, a water area, lies W of Breidangen and between Langoya and the W shore of the basin. It provides access to Sandebukta, an inlet located at the NW side of the basin.

4.16 **Holmestrand** (59°29'N., 10°19'E.) (World Port Index No. 23760) is situated 1 mile NW of Mulodden Light. The town center stands at the foot of a mountain, near the harbor, and several built-up areas extend along the sides of the coastal hills.

Five main berths, 25 to 70m long, are situated in the harbor fronting the town and have depths of 2.9 to 7.1m alongside.

A number of anchorage berths are situated off the town and are used for laying-up vessels of up to 450,000 tons.

Selvikbukta (59°34'N., 10°16'E.), the site of a paper plant, is located at the head of Sandebukta. There is concrete quay, 145m long, with depths of 5.5 to 9.3m alongside.

Anchorage is available, in depths of 10 to 30m, clay, good holding ground, at the head of the inlet. Local knowledge is advised.

Caution.—Several submarine cables and pipelines, which may best be seen on the chart, extend seaward from the W side of the basin in the vicinity of Holmestrand.

Dramsfjorden

4.17 **Dramsfjorden** (59°32'N., 10°24'E.) extends about 15 miles NNW from the entrance and Drammen is situated at its head. The entrance lies between Rodtangen Light and the E extremity of a shallow spit, which extends about 0.2 mile from the mainland shore and is marked by a buoy.

Rodtangen Light (59°32'N., 10°25'E.) is shown from a structure standing on the S side of Hurum, 3.8 miles NW of Molen Light, and indicates the approach to the entrance to Dramsfjorden.

Kroksberget Light (59°34'N., 10°25'E.) is shown from a structure standing on the W side of the fjord, 1.9 miles NNW of Rodtangen Light, and indicates the entrance fairway.

Bjorneskjer Light (59°35'N., 10°26'E.) is shown from a framework structure standing on the N end of an islet lying close off the E side the fjord, 1.5 miles NNE of Kroksberget Light.

Svelvikrenna Sondre Light (59°36'N., 10°25'E.), equipped with a racon, is shown from a structure standing on the W side of the fjord, 0.9 mile NW of Bjorneskjer Light.

Svelvikstrommen (59°37'N., 10°25'E.), a narrow channel, leads through a constriction, about 4.5 miles N of the fjord entrance. Ryggen, a peninsula, extends W across the fjord and reduces the passage to a width of only about 200m for a length of 0.6 mile. This constriction divides the fjord into inner and outer parts. The channel, which is subject to silting, is marked by buoys and indicated by lighted ranges.

Svelvikstrommen from S

Blindesk Light (59°37'N., 10°25'E.) is shown from a structure standing on the W side of the inner part of the fjord, 1.6 miles NNW of Svelvikrenna Sondre Light.

Steinsbaten Light (59°41'N., 10°22'E.) is shown from a structure standing on the W side of the fjord 3.9 miles NNW of Blindesk Light.

Ice.—Generally, the outer part of Dramsfjorden is always free of ice. The inner part, N of Svelvikstrommen, is frozen every winter, but a navigable route is kept open by icebreakers. However, with strong N winds, broken ice can accumulate in Svelvikstrommen.

Depths—Limitations.—The fairway leading through Svelvikstrommen is dredged to a depth of 10m over a width of 100m.

An overhead cable spans the N part of Svelvikstrommen and has a vertical clearance of 46m.

Tides—Currents.—The normal tidal range is 0.3m, but the water level can be strongly influenced by meteorological conditions. Within the fjord, a low air pressure with a wind from the S may cause the water level to rise; while winds from the N may have an opposite effect. Under extreme conditions, the

range of the water level in Svelvikstrommen may be in-creased by as much as 1.8m.

When, due to wind conditions, the water level rises in Oslofjorden above that in the outer part of Dramsfjorden, an inbound movement of salt water flows N to Svelvikstrommen. When this flow meets the fresh water heading S from the Dramselva River, particularly during an ebb tide, turbulence, with strong swirls, may be caused in the channel. The handling of vessels within the channel may be difficult under these conditions.

Within Svelvikstrommen, under normal conditions, the flow sets N with the rising tide and S with the falling tide. The S or outgoing flow generally lasts longer than the N flow. The outgoing flow can periodically attain a rate of about 5 knots; while the incoming flow attains a rate of 2 to 3 knots.

Local weather conditions greatly affect the normal flow. With strong SW winds, the incoming flow may set N continuously for 24 hours or more; while the reverse occurs during strong N winds. When the Dramselva River is in flood state or after a long period of rain, the outgoing flow may attain a maximum rate of 6 to 8 knots. However, such rates have not been observed recently since the fairway channel was deepened and straightened.

Under normal circumstances, the flow within the inner part of the fjord is not noticeable. It is only after passing Nostodden, located about 1 mile S of Drammen, that a strong outgoing flow may be expected when the Dramselva River is in flood.

Svelvikstrommen is subject to silting and must be continuously dredged in order to maintain depths over a bottom width of 100m. The least charted depth along the centerline of the channel was reported to be 9.4m.

Regulations.—All vessels intending to proceed through Svelvikstrommen should keep watch on VHF channel 16. They should also inform other vessels on that channel, in good time, of their intended time of passage.

Small vessels should keep clear of the dredged channel in Svelvikstrommen when deep-draft vessels are passing through.

A speed limit of 7 knots is in force within the channel at Svelvikstrommen.

Caution.—Generally, vessels should commence their passage through Svelvikstrommen a little before HW as this results in the deepest water and the least water flow.

A ferry, which may be contacted by VHF, crosses the N part of Svelvikstrommen.

Svelvikstrommen is subject to silting and dredges may be encountered within the channel.

Several submarine cables and pipelines, which may best be seen on the chart, lie within the inner and outer parts of Dramfjorden.

4.18 **Svelvik** (59°37'N., 10°24'E.) (World Port Index No. 23770) is situated on the W side of Svelvikstrommen and serves a small industrial complex. This small harbor, which is managed by the authorities at Drammen, provides five berths. The largest is 184m long and has depths of 3.5 to 4.2m alongside.

Verket (59°37'N., 10°26'E.) is located on the S side of Ryggen and serves a quarry. There is a quay, 113m long, with depths of 2.1 to 4.3m alongside.

Dramstadbukta, the water area lying close N of Ryggen, provides anchorage to vessels with local knowledge, in a depth of 38m, sand and mud.

Torkopp (59°41'N., 10°19'E.) is located on the W side of the fjord, 1.5 miles WNW of Steinsbraten Light. There is a quay, 59m long, with depths of 10.3 to 17.5m alongside.

Jordfallbukta (59°43'N., 10°21'E.) is located at the E side of the fjord, 1.8 miles NNW of Steinsbraten Light. There is a quay, 35m long, with depths of 5 to 7.5m alongside.

Solumsbukta (59°43'N., 10°16'E.) is located at the W side of the fjord, 3.5 miles NW of Steinsbraten Light. There is a pier, which serves an oil and gas installation, with a depth of 4.8m alongside.

Engersandbukta (59°44'N., 10°18'E.) is located at the NE side of the fjord, 1.5 miles NE of Solumsbukta. There are three quays. The largest is 36m long and has depths of 2.3 to 5.4m alongside.

Gullaugbukta (59°45'N., 10°17'E.) lies at the NE side of the fjord, 0.5 mile NW of Engersandbukta. There is a quay, 53m long, with depths of 5 to 5.8m alongside. This is the site of an explosives factory.

Gilhusbukta (59°45'N., 10°16'E.) lies at the N side of the fjord, 0.6 mile W of Gullangbukta. There is a quay, 78m long, with depths of 3.8 to 6.3m alongside.

Numerous small craft use Dramsfjorden, especially during the summer months. Several small craft harbors and marinas are situated within the fjord. The principal facilities include the following:

1. Holmsbu (59°33.5'N., 10°25.6'E.).
2. Bokeroya (59°35.5'N., 10°24.6'E.).
3. Hernestangen (59°41.5'N., 10°23.6'E.).
4. Solumstranda (59°42.6'N., 10°16.5'E.).

Drammen (59°44'N., 10°14'E.)

World Port Index No. 23780

4.19 Drammen is situated at the head of Dramsfjorden and serves an extensive industrial area. The town stands on both banks of the mouth of the Dramselva River.

The island of Holmen lies at the mouth of the river and divides it into two parts. Tangenrenna, the channel leading S of the island forms the main section of the harbor. The channel leading N of the island is shallow and obstructed.

Drammen from W

Depths—Limitations.—Bridges, with a minimum vertical clearance of 5.5m, span Tangenrenna at the W end of Holmen.

The port provides about 3,000m of total berhage. There are six berths located at the S side of Tangenrenna. The main berths are Langbrygga, which is 260m long and has a depth of 8m alongside, and Tjomekrankaia, which is 165m long and has a depth of 7m alongside.

There are nine berths located at the N side of Tangenrenna. The main berths are Holmen Syd-kaia, which is 486m long and has a depth of 9m alongside, and Tronstadkaia, which is 168m long and has a depth of 10m alongside.

The port has facilities for general cargo, container, bulk, tanker, ro-ro, ferry, and automobile carrier vessels. Vessels up to 225m in length and 9.1m draft can be accommodated. Vessels are restricted in size by the controlling depth in Svelvikstrommen, as described in paragraph 4.17.

A large shipyard, with two floating docks, is situated in the port. It is fronted by about 500m of quayage, with depths up to 6.8m alongside. The largest floating dock is 175m long and 24m wide. It can handle vessels up to 24,000 dwt.

Pilotage.—See Pilotage under Oslofjorden (paragraph 4.9).

Regulations.—In addition to participating in the Oslofjorden VTS system, described in paragraph 4.9, all inbound vessels must report to Horten Control Center on VHF channel 19 when passing Molen Light (59°29'N., 10°30'E.). The VTS Control Center will then give permission to proceed to the port and provide traffic information. Vessels should also make a final report when berthed. Port can also be contacted on Drammenenhavne Radio on VHF channel 11 12 16 and 19 and via:

Drammen http:// www.drammenhaven.no/index.php/engelsk/
E-mail : firmapost@drammenhavn.no

Inbound and outbound vessels generally agree between themselves as to which will pass through Svelvikstrommen first.

Anchorage.—Vessels without a berthing assignment may anchor E of Holmen, in a depth of about 30m, sand and clay, good holding ground.

Oslofjorden—East Side

4.20 The E side of Oslofjorden E side, between Stromtangen Light (59°09'N., 10°50'E.) and Filvet Light (59°34'N., 10°37'E.), is fringed by numerous islands, islets, rocks, and areas of foul ground. Numerous channels lead be-tween these off-lying dangers.

The main inner passage, used by small vessels with local knowledge, leads NNW through Ytreleia (59°11'N., 10°45'E.) and passes E of Sondre Missingen. It continues NNW through Rauerfjorden (59°14'N., 10°43'E.) and Krokstadleira (59°17'N., 10°42'E.), passing E of Rauer. The route then leads between the mainland coast and the off-lying islands of E Store Sletter, Eldoya, and Kolen. It connects with the main channel in the fjord about 2 miles ENE of Medfjordbaen Light (59°20'N., 10°34'E.). The fairway is very narrow in places and is reported to have a least depth 15m.

Garnholme Light (59°11.5'N., 10°45.8'E.) is shown from a structure standing on the S side of an islet lying 2 miles NE of Sondre Missingen. A conspicuous monument, surmounted by an anchor, is located close N of this light.

Numerous small harbors and marinas, used only by small craft and fishing vessels, are situated along this stretch of the fjord. The main facilities include the following:

1. Missinghavn (59°10.2'N., 10°42.6'E.).
2. Slevikkilen (59°11.6'N., 10°48.8'E.).
3. Hankohavn (59°12.0'N., 10°46.5'E.).
4. Hankosundet (59°12'N., 10°48'E.).
5. Saltnessund (59°17'N., 10°45E.).
6. Kurefjorden (59°20'N., 10°44'E.).
7. Rorvika (59°19.5'N., 10°41.0'E.).
8. Larkollen (59°20'N., 10°40'E.).
9. Evjesundet (59°21.5'N., 10°40.0'E.).
10. Fulevik (59°23'N., 10°39'E.).
11. Engelsviken (59°15'N., 10°44'E.).
12. Son (59°31'N., 10°41'E.).

4.21 **Jeloya** (59°27'N., 10°38'E.), rising to a height of 138m, is a large island lying close off the E side of the fjord. Its W side is fronted by foul ground and shallow detached reefs, which may best be seen on the chart.

An isthmus connects the SE side of this island to the mainland and Verlebukta, a bay, lies on its S side.

Mossesundet (59°28'N., 10°40'E.), a narrow inlet, lies between the mainland and the E side of Jeloya. Mosskanalen, a canal, leads through the isthmus and connects the S end of Mossesundet to Verlebukta. The canal is spanned by a bascule bridge, which has a vertical clearance of 4.5m and is permanently closed. It is 10m wide and has a depth of 4m.

Verlebrygga Light is shown from a structure standing at the head of a pier located at the SE end of the canal.

Saueholmenene Light (59°31'N., 10°40'E.) is shown from a structure standing on the W side of the southernmost islet of a chain of islets lying close off the E side of the fjord, 4 miles SSE of Filvet Light.

Directions.—Mossesundet is entered between Saueholmenene Light and the E side of Bevoya, an islet lying close off the N end of Jeloya, 0.7 mile W. The approach track leads in a SE direction, using the white sector of the light, and passes NE of the dangers lying off the NW side of Jeloya.

The approach to Verlebukta leads in a NNE direction, using the white sector of Verlebrygga Light, and passing WNW of Revlingrevet Light (59°24'N., 10°38'E.).

Moss (59°26'N., 10°40'E.)

World Port Index No. 23830

4.22 Moss stands around the isthmus connecting Jeloya to the mainland and about 26 miles N of the entrance to Oslofjorden. The S part of the harbor lies at the head of Verlebukta and the N part lies at the head of Mossesundet.

The port serves an industrial area and is a terminal for the ferry that runs to Horten. A small river flows into the E side of Mossesundet from a series of lakes lying E of the town.

The port also includes the facilities situated at Kambo (Mossesundet at Kambo) (59°28'N., 10°41'E.) which lies at the E

Moss from S

side of the inlet 2.7 miles N of the head.

Winds—Weather.—The N part of the harbor is sheltered from all winds. However, the S part of the harbor is open to SW gales and the working of cargo may be interrupted.

Ice.—During severe winters, ice forms in both parts of the harbor, but the channels are normally kept open by icebreakers.

Tides—Currents.—The tidal range is normally about 0.3m, but, during SW gales, the water level may rise by as much as 2m.

Depths—Limitations.—The S part of the harbor provides eight berths. The principal berths are East Verlebrygga, which is 243m long and has depths of 5.9 to 10.2m alongside; and the Container Terminal, which is 190m long (with dolphins) and has depths of 8.8 to 10.8m alongside.

The N part of the harbor at Moss provides ten berths and is the site of a shipyard. The largest berth is 150m long and has depths of 9.7 to 12.1m alongside.

Kambo, in the N part of the harbor, provides four berths. The principal berths are Norsk Gulf Oil Terminal, which is 61m long and has depths of 14.4 to 17.7m alongside, and Felleskjopet Bulk Berth, which is 144m long and has depths of 9.7 to 11.7m alongside. Tankers may also be anchored off the terminal and secured by the stern.

There are facilities for general cargo, bulk, ro-ro, ferry, tanker, and container vessels. Vessels up to 20,000 dwt and 9.5m draft can be accommodated in the S part of the harbor; while vessels up to 28,000 dwt and 11m draft can be accommodated in the N part.

Aspect.—A light is shown from a structure standing at the head of a pier located at the SE end of the canal. A conspicuous church stands about 0.5 mile NNE of the light. A prominent chimney is situated on the E side of the N part of the harbor about 0.9 mile NNE of the light.

Anchorage.—Anchorage is available, in depths of 20 to 30m, mud, at the head of Mossesundet. Anchorage is also available, in depths of 30 to 47m, mud, at the E side of the inlet about 0.2 mile N of the river mouth.

Caution.—A wreck, with a least depth of 8m, lies in the approaches, about 0.3 mile SW of Verlebrygga Light.

In Verlebukta the direction of buoyage is from S to N; while in Mossekanalen and Mossesundet the direction is from N to S.

Indre Oslofjorden

4.23 Indre Oslofjorden, the N part of the fjord, consists of the waters lying N of Filvet Light (59°34'N., 10°37'E.). This section of the fjord extends N for about 20 miles to Oslo.

The lower and upper reaches of this section are comparatively wide, but the fjord narrows about 6 miles N of Filvet Light in the vicinity of several islets. At the NW end of this section, a series of islets extends, in remarkable parallel rows, across the head of the fjord and obstructs the navigable passage. Bonnefjorden, a continuation of Indre Oslofjorden, extends S for about 10 miles from the vicinity of Oslo.

Vestfjorden (59°42'N., 10°33'E.), a branch passage, leads along the W side of Indre Oslofjorden. It is obstructed by several dangers at the S end and does not provide a practicable route to Oslo or the N part of the fjord.uruholmen

Numerous small harbors and marinas, used only by small craft and fishing vessels, are situated along both sides of this section of the fjord.

The main facilities include the following:

1. Husvikholmen (59°40.5'N., 10°37.5'E.).
2. Storsand (59°39'N., 10°36'E.).
3. Furuholmen (59°40.5.'N., 10°33.9'E.).
4. Hjelp (59°41.6.'N., 10°31.9'E.).
5. Tajebukta (59°42'N., 10°34'E.).
6. Bjornhuebukta (59°43.0'N., 10°33.3'E.).
7. Naernesbukta (59°45.7'N., 10°29.9'E.).
8. Vollenbukta (59°49'N., 10°30'E.).

The main small craft facilities at the NW side of the head of the fjord include the following:

1. Leangbukta (59°50'N., 10°29'E.).
2. Holmen (59°51.5'N., 10°29.9'E.).
3. Nesbukta (59°51.7'N., 10°30.4'E.).
4. Holtekilen (59°54'N., 10°36'E.).
5. Langarsundet (59°51'N., 10°33'E.).
6. Boroya (59°53'N., 10°33'E.).
7. Sandvika (59°53'N., 10°32'E.).
8. Kavringen (59°50.8'N., 10°38.7'E.).

Regulations.—Vessels, when underway within Indre Oslofjorden, between Filtvet Light and Oslo, must proceed at a moderate speed in order to prevent wash damage or cause inconvenience to vessels berthed alongside.

A large part of the main route leading through Indre Oslofjorden is designated as a Precautionary Area and may best be seen on the chart. All vessels must navigate with extreme caution when passing though this area.

Directions.—For information concerning the main shipping route through Indre Oslofjorden, see Directions under Oslofjorden in paragraph 4.9.

4.24 Halvorshavn (59°35'N., 10°37'E.), an oil depot, is situated about 0.7 mile N of Filvet Light. There is a quay, 70m long, with depths of 10.7 to 12.2m alongside, which can handle tankers up to 35,000 dwt. A number of conspicuous white tanks stand at the depot.

Drobak (59°40'N., 10°38'E.) (World Port Index No. 23820), a small harbor, is situated about 0.4 mile NNW of Elle Light. It is the site of a marine biological station. The harbor provides six main berths. The largest is 45m long and has depths of 2.3 to 3.5m alongside.

Engene (59°41'N., 10°32'E.), the site of an explosives factory, is located on the SW side of Vestfjorden about 3 miles NW of Drobak. It lies at the SE side of Saetrepollen, a large harbor area. The main quay is 36m long and has depths of 9.2 to 9.4m alongside.

Caution.—Entry to Engene is sometimes prohibited for safety reasons when testing of explosives is being carried out.

4.25 Fagerstrand (59°44'N., 10°35'E.), an oil depot, is located on the E side of the fjord about 0.6 mile NNE of Aspond Light. Several conspicuous tanks stand in this vicinity. The depot provides nine berths. The main facility consists of a jetty, 200m long, with depths of 8.9 to 12m alongside. Tankers up to 35,000 dwt can be accommodated.

Slemmestad (59°47'N., 10°30'E.) is located at the W side of the fjord. It is the site of a prominent silo station (a former cement factory). The main quay, which lies at the NW side of a basin, is 180m long and has depths of 7.2 to 12.3m alongside. Another quay, located at the SE side of the basin, has a berth, 135m long, with depths of 9.6 to 10.7m alongside.

4.26 Granerudstoa (59°47'N., 10°36'E.), a former oil depot, is situated 2.2 miles S of Steilene Light and is the site of a repair yard. A number of conspicuous tanks stand in the vicinity of the yard. The harbor provides 12 berths. The largest berth lies on the NW side of the southernmost of two angled jetties. It 160m long and has depths of 9.6 to 15.4m alongside.

Bjorkas (59°47.6'N., 10°29.9'E.) is situated on the W side of the fjord about 0.5 mile N of Slemmestad. A quay, located on the N side of a cove, is 105m long and has depths of 7.9 to 10.1m alongside.

Bunnefjorden (59°49'N., 10°44'E.), the continuation of the head of Oslofjorden, extends SSE for about 9 miles from the vicinity of Nesoddtangen Light. This inlet narrows near its head, which is spanned by an overhead cable with a vertical clearance of 34m.

This inlet contains several small craft harbors but, overall, is of no significance to commercial ocean-going vessels.

Lysakerfjorden (59°54'N., 10°39'E.) lies close W of Oslo and 1.3 miles N of Nesoddtangen Light. This inlet, which is entered between two peninsulas, continues NE from its head into Bestumkilen, a shallow bay. Several small craft harbors and marinas are situated within the inlet and its continuation. Oslo International Airport is situated on the peninsula at the W side of the inlet.

Lysaker (59°54.7'N., 10°38.6'E.), an oil depot, is situated at the W side of the head of the inlet and serves a chemical complex. There are five berths. The main berth is 89m long and has depths of 9.8 to 10.5m alongside. Vessels up to 35,000 dwt can be handled.

Rolfstangen (59°53.5'N., 10°38.0'E.), an oil depot, is situated at the W side of the inlet and serves the airport. The main berth is 40m long and has depths of 7.3 to 9.3m alongside.

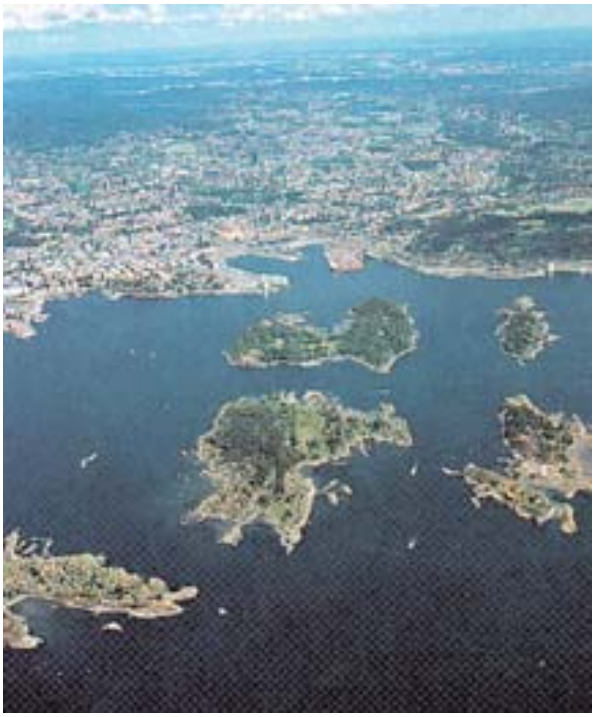
Caution.—A seaplane operating area extends along the W side of Lysakerfjorden. Entry into the inlet is controlled during landings and take-offs.

Several submarine cables and pipelines, which may best be seen on the chart, lie within Lysakerfjorden.

Approaches to Oslo

4.27 The direct route to Oslo from the vicinity of Nesodtangen Light, which has been described in paragraph 4.9, is obstructed by a group of islands and shoals, which fronts the harbor and may best be seen on the chart.

Two principal routes lead through the group of islands and shoals to the harbor facilities. The third route, or middle channel, which leads between the SE side of Lindoya (59°53.4'N., 10°42.8'E.) and the NW side of Gressholem, is narrow, comparatively shallow, and not recommended for use.



Approaches to Oslo from SW

Western Channel (59°53.6'N., 10°41.5'E.), a main route, lies between the S side of the Bygdoy Peninsula and the N side of the island of Nakkholmen, about 0.4 mile SSE. It is approached by passing NW of Nesodtangen Light.

The channel leads between Dyna Light, marking a shoal lying on the N side, and Koppernaglen Light, marking a shoal lying on the S side. It has a minimum width of about 220m, between the lights, and a least depth of 12m.

Dyna Light (59°53.7'N., 10°41.3'E.) is shown from a prominent building, 12m high, standing on a rock.

Southern Channel (59°52.6'N., 10°43.1'E.), a main route, passes between the N side of Nordre Langoya, marked by a light, and the S side of Rambergoya, marked by a beacon. It is approached by rounding the dangers fringing Nesodtangen Light.

This route continues in a NE direction through Bleikoysundet to Eastern Harbor. Vessels may also round the E end of Rambergoya and continue in a NNW direction through Springeren (59°53.3'N., 10°43.6'E.) to Western Harbor.

Dyna Light

Vessels must not exceed a speed of 5 knots within Bleikoysundet. Southern Channel and both of the continuing fairways have a least depth of 17m.

An alternative track leading NE and then NNW to the S entrance of Springeren passes between the S side of Husbergoya (59°51.7'N., 10°42.9'E.) and the N side of Nordre Skjaerholmen, 0.4 mile SSE. Because this route avoids the sharp turn around the E end of Rambergoy, it is used by deep-draft vessels, with high freeboards, during strong winds.

Oslo (59°54'N., 10°45'E.)

World Port Index No. 23810

4.28 Oslo, the capital of Norway and a popular resort, is situated on the NE side of the head of Oslofjorden. The extensive city spreads out over the greater part of the slopes rising gently inland to heavily forested background hills.

The harbor fronts the city and extends for about 5 miles along the offshore area. It is protected from S by a group of islands and rocky shoals.

Oslo Port Authority Home Page
www.oslohavn.no/english

Tides—Currents

The tidal range in the harbor is negligible, being about 0.3m at springs and 0.2m at neaps.

Meteorological conditions have the greatest influence on the water level. Winds from N reduce the level and winds from S increase it. The highest water level observed was 1.9m above normal and the lowest level observed was 1.1m below the normal.

The current flows in a counterclockwise loop through the harbor area. It is very weak and usually has little significance for navigation.

Depths—Limitations

Western Harbour is situated in the N part of the port and includes the facilities bordering the water areas of Frognerkilen and Pipervika, which lie 0.8 mile NNE and 1.4 miles ENE, respectively, of Dyna Light.

Eastern Harbour extends S from Western Harbor along the E side of the port. It includes the water area of Bjorvika at its N end. Sjursoya, an oil terminal, is situated near the S end of Eastern Harbor.

The port provides about 8,200m of principal commercial quayage. Western Harbor provides 17 berths. The main facilities include Filipstadkaien, which is 823m long and has depths of 8.5 to 10m alongside, and Sondre Akershuskaien, which is 199m long and has depths of 5.5 to 10.2m alongside.

Estern Harbour provides 14 berths. The main facilities include Revierkaien, which is 362m long and has depths of 9.3 to 10.8m alongside, and Sorengutstikkeren, which is 880m long and has depths of 6 to 9m alongside.

Oslo—Western Harbour

Sjursoya Oil Terminal (Ekeberg Oil Terminal) has 234m of total quayage and provides eight berths, with depths up to 29m alongside. It can handle tankers up to 35,000 dwt.

The port has extensive facilities for general cargo, container, ro-ro, tanker, bulk, cruise, and ferry vessels. Vessels up to 10.9m draft can be accommodated.

Large marinas are situated at the NE side of Hovedoya and within Frognerkilen.

Aspect

Trefoldighets Church (59°55.0'N., 10°44.7'E.) stands in the city, 2.2 miles NE of Dyna Light, and is conspicuous. It has a large green dome over the center which is surmounted by a small thin steeple. Two small brick towers are situated at its SW and NW comers.

Var Frelsers Church, situated about 0.3 mile S of Trefol-

Oslo—Eastern Harbour

Oslo—Sjursoya

dighets Church, is conspicuous. It has a tower, surmounted by a tall weather vane, rising above the trees.

The Palace stands 0.5 mile W of Trefoldighets Church and is prominent. It consists of a light-colored stone building, with a dark roof, surmounted by a tall flag staff.

The Town Hall stands about 0.5 mile SW of Trefoldighets Church and is prominent. It has two tall brick-colored towers.

A prominent stone tower, with a green conical roof, is built into the outer wall of the fort standing at Akershus, about 0.7 mile SSW of Trefoldighets Church.

A prominent navigation school stands at the E side of the harbor about 1.2 miles SSE of Trefoldighets Church. It consists of a large four-sided building, with towers at each corner, situated on a scrub covered hill.

Pilotage

For information concerning pilotage, see Pilotage under Oslofjorden (paragraph 4.9).

Oslo Town Hall

Regulations

For details of the Oslofjorden VTS system, see Regulations under Oslofjorden in paragraph 4.9.

All vessels should send an ETA by VHF to the Port Authority 1 hour prior to arrival.

Tankers over 35,000 dwt are not permitted to enter the harbor.

Tankers with a draft over 9.1m may only enter the harbor during daylight.

Rules are in effect concerning the speed of vessels such that, in general throughout the harbor, speed should never become so great as to endanger shoreside facilities or other vessels.

Anchorage

Anchorage, for vessels without a berth assignment, is available in areas close N of the N end of Lindoya (59°53.4'N., 10°42.8'E.) and SW of Eastern Harbor.

Vessels can anchor, in depths up to 20m, close NE of the E end of Hovedoya (59°53.6'N., 10°44.0'E.). The deepest anchorage, with a depth of 24m, lies about 0.3 mile WNW of the islet of Kavringen (59°54.0'N., 10°43.3'E.).

An anchorage, used mostly by cruise vessels and warships, lies in a depth of 22m, mud, about 0.3 mile NE of Kavringen.

Caution

Several submarine pipelines and cables lie within the harbor area and may best be seen on the chart.

A number of mooring buoys are situated throughout the harbor area and may best be seen on the chart.

A number of small ferries may be encountered within the harbor area.

Oslofjorden—Southeast Environs

4.29 The SE environs of Oslofjorden consist of that part of the mainland extending from Stromtangen Light (59°09'N., 10°50'E.) to Sekken (Sacken), a waterway located at the border between Norway and Sweden, about 12 miles SE.

Hvaler is the collective name of the extensive group of islands and islets, which may best be seen on the chart, that front this stretch of the mainland. The principal islands of this group, from SE, are Herfol, Sondre Sandoy, Nordre Sandoy, Kirkoy, Asmaloya, Akeroya, Spjaeroy, Vesteroy, and Papperoy. Kraker-

oy, a large wooded island, extends N between the N side of Vesteroy and the mainland in the vicinity of Fredrikstad. Numerous rocks and shoals fringe the group and may best be seen on the chart.

Ringdalsfjorden and Iddefjorden, a continuation, lead ENE and SE for about 12 miles from the E side of the bight that indents this part of the mainland. These fjords extend inland and are shared between Norway and Sweden.

The main commercial ports in this area include Halden (59°07'N., 11°23'E.), Fredrikstad (59°12'N., 10°57'E.), and Sarpsborg (59°16'N., 11°06'E.). The administrative authority which operates the ports of Fredrikstad and Sarpsborg is known as Borg Harbor.

Numerous small craft harbors and marinas, some of which were formerly used by fishing vessels, lie within the Hvaler group. The principal facilities include:

1. Vikerhavn (59°02'N., 10°57'E.).
2. Skipstadhavn (59°03.7'N., 10°57.4'E.).
3. Korshavn (59°04.5'N., 11°00.0'E.)
4. Utgardskilen (59°04.6'N., 10°52.3'E.).
5. Tislerkilen (58°59'N., 10°57'E.).
6. Papperbukta (59°07'N., 10°50'E.)
7. Stokken (59°07.5'N., 10°55.1'E.).
8. Oyenkilen (59°10.3'N., 10°50.8'E.).
9. Fjellskilen (59°11'N., 10°52'E.).
10. Vikerkilen (59°11.2'N., 10°52.6'E.).
11. Bolingshavn (59°03.5'N., 11°03.2'E.).
12. Monsterboden (59°08'N., 10°57'E.).
13. Trolldalen (59°08.6'N., 10°56.5'E.).
14. Brattesto (59°03.4'N., 10°55.1'E.).
15. Sand (59°05'N., 10°56'E.).
16. Kjellvika (59°04.5'N., 10°53.4'E.)
17. Herfolrenna (59°00.2'N., 11°03.4'E.).
18. Skjaerhalden (59°01.5'N., 11°02.4'E.).
19. Skjeberg (59°11.5'N., 11°10.9'E.).
20. Nedgarden (59°01'N., 11°04'E.).
21. Buvika (59°01.5'N., 11°06.4'E.).
22. Grimsoykilen (59°09'N., 11°12'E.).
23. Delebekk (59°11'N., 11°09'E.).

Aspect.—The islands in the Hvaler group are comparatively low and are formed of grayish-yellow stone. The outer islets are bare while the larger inner islands are often wooded. Although the region at the inner side of the group is highly populated, almost no built-up areas are visible from seaward.

The border between Norway and Sweden, which is indicated on the chart, extends in a WSW direction from the entrance to Sekken (58°59'N., 11°05'E.).

Borg Harbor (59°12'N., 10°57'E.) is situated at the mouth of River Glomma and incorporates the ports of Fredrikstad and Sarpsborg.

Pilotage.—Pilotage services for Borg Harbor (Fredrikstad and Sarpsborg) must be arranged through Oslofjorden (Horten) Pilot Center. For further information, see paragraph 4.1 and paragraph 4.9.

Pilotage is compulsory for all foreign vessels over 100 grt.

This station also provides pilotage for Halden.

Pilots can be contacted by VHF and board in the vicinity of Faerder Light (59°04'N., 10°34'E.), and between Tresteinene Light (59°00'N., 10°47'E.) and Vidgrund Light, 2 miles E.

Vessels should also send an ETA to the Borg Harbor Control Center 24 hours, 12 hours, and 6 hours prior to arrival.

Borg Harbor Control can be contacted on VHF channel 16 and 12 also via:

Borg Harbor
http://www.borghavn.of.no
E-mail borg.havnevesen@borghavn.of.no

Regulations.—Most of the SE environs of Oslofjorden lie within the restricted inner (internal) waters of Norway. Entry of foreign commercial vessels into the inner (internal) waters is subject to certain regulations and procedures. For further details, see Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

The SE environs lie within Sector 1 of the Oslofjorden VTS system. For further details, see Regulations under Oslofjorden in paragraph 4.9.

Caution.—Several submarine cables and pipelines, which may best be seen on the chart, extend between the islands in the Hvaler group and the mainland.

A number of overhead cables and bridges, which may best be seen on the chart, span the narrow passages lying between the islands of the Hvaler group and connect the group to the mainland.

4.30 Struten Light (59°07'N., 10°45'E.), previously described in paragraph 4.3, is shown from an islet lying at the NE end of the Sostrene group and marks the W limit of the dangers in the approaches.

Strutskrakkene, formed by two isolated shallow shoal patches, lies 1.3 miles NNE of the light and is marked by a buoy.

Seikrakk, a detached shoal patch, lies about 2.8 miles SSE of the light. It has a least depth of 3.5m and is marked by a buoy. This shoal may be passed on either side.

Torbjornskjaer Light (59°00'N., 10°47'E.), previously described in paragraph 4.2, is shown from an islet and marks the SW limit of the dangers in the approaches.

Skjerskrakkene, a shoal bank with a least depth of 5m, lies at the seaward extremity of the dangers extending up to about 1 mile NW of the light and is marked by a buoy.

Mefjordbaen, a shoal bank with a least depth of 10m, lies about 1.7 miles N of the light and is marked by a buoy.

Vessels approaching from W should pass well to the N of these dangers.

Between Torbjornskjaer Light and the border between Norway and Sweden, about 5 miles SE, there are a few islets, many shoal patches, and hundreds of rocks, both awash and submerged. Heia, the largest islet, lies 3.5 miles SE of Torbjornskjaer Light and is marked by a beacon, 6m high. A signal mast stands in the NE part of this islet. Kuskjaer, a rock, lies about midway between Heia and Torbjornskjaer Light and is marked by a beacon. During heavy weather, the sea breaks over all of these dangers.

Several narrow channels, used by small vessels in good weather, lead through these dangers but local knowledge is required.

4.31 Stromtangen Light (59°09'N., 10°50'E.), previously described in paragraph 4.4, is shown from the S end of an islet lying close off the mainland.

Stangeskjaer Lighted Beacon (59°08'N., 10°53'E.) is situated on a rock 2 miles SE of Stromtangen Light. A number of detached shoals, with a least depth of 7m, lie across the entrance to Leira Bay between this lighted beacon and Stromtangen Light.

Tenneskjaer Light (59°08'N., 10°54'E.) is shown from a structure standing on a rock about 0.5 mile SE of Stangeskjaer Lighted Beacon.

Papperhavn Light (59°06'N., 10°50'E.) is shown from a hut standing on Lyngholmen, an islet lying 2.5 miles S of Stromtangen Light.

Vesterelva (59°11'N., 10°53'E.), leading between the NW side of Krakeroy and the mainland, is entered from the N part of Lera Bay. This passage leads NE to Borg Harbor.

Gasungene Light (59°10.8'N., 10°52.3'E.) is shown from a structure standing on a rock which lies close off the NW side of the entrance to Vesterelva.

Kraka, an islet, lies near mid-channel, about 0.2 mile ESE of the light, and a rocky reef extends from its N side. Sondre Krakebaen, a detached shoal patch, lies 0.2 mile S of the light. It has a least depth of 2m and is marked by a lighted buoy.

Krosnespynten Light (59°11.9'N., 10°53.8'E.) is shown from a structure standing on the NW side of Vesterelvat, 1.4 miles NE of Gasungene Light.

Huthholmen, an islet, lies close to the E side of the channel, 0.4 mile NNE of Krosnespynten Light, and is marked by a light on its SE side.

Anchorage.—Anchorage can be obtained by large vessels, in depths, of 25 to 27m near the middle of Lera, about 1.2 miles ENE of Stromtangen Light. Anchorage is also available, in a depth of 13m, off the entrance to Vesterelvat about 0.3 mile S of Kraka.

Directions.—The main alternate route leading to Fredrikstad and Sarpsborg (Borg Harbor) from W passes between Struten Light and Strutskrakkene, 1.3 miles NNE. It leads in an ENE direction using the white sector of Stromtangen Light. This route then leads ESE, passing SSW of Stromtangen Light, using the white sector of Tenneskjaer Light.

The route may also be approached from SW by passing either side of Seikrakk and E of the Sostrene group.

When 1.5 miles from Tenneskjaer Light, the route continues in a N direction, using the white sector of Gasungane Light, to the entrance to Vesterelva.

The principal route leading into Vesterelva passes close W of Sondre Krakebaen and then continues in a NE direction. It passes close SE of Gasungane Light and lies close to the NW shore of the passage. This route then passes through the narrows lying close SE of Krosnespynten Light. It continues within a buoyed channel which passes W of Huthholmen and leads N and NE into Fredrikstad.

Caution.—The strong outflow from Vesterelva frequently causes turbulence in the area off Stromtangen Light.

4.32 Tresteinene Light (59°02'N., 10°54'E.), previously described in paragraph 4.2, is shown from a group of rocks and is equipped with a racon. Tisler, a group of islets and rocks, lies 3 miles SSE of this light.

Vidgrunnen Light (59°01.6'N., 10°57.5'E.) is shown from a structure standing on a rock lying in the approach to Loperen, about 1.9 miles E of Testeinene Light. Fugleskjaer Light, located 0.6 mile NNE of Vidgrunnen Light, is shown from a structure standing on a rock lying at the seaward end of a spit which fronts the W entrance point of Loperen.

Kvernskjaer, an islet, lies in the middle of the entrance, about 0.7 mile NE of Vidgrunnen Light. A rocky reef extends about 0.4 mile NNW from the N end of this islet and is marked by two lights.

Homlungen Light (59°01.0'N., 11°01.4'E.) is shown from a tower on a hut, 12m high, standing on an islet 4 miles ESE of Tresteinene Light.

Homlungen Light

Sekkefluene (Soekkeflunene) Light (58°59.0'N., 11°03.4'E.) is shown from a structure standing on a group of rocks lying off the S side of Herfol, 2.2 miles SSE of Homlungen Light.

Klovningarna Light (58°56'N., 11°00'E.), equipped with a racon, is situated 6.3 miles SSE of Tresteinene Light. Norde Hallso Light (58°58.0'N., 11°04.5'E.) is located 3.4 miles NE of Klovningarna Light. These two lights are located in Swedish waters and are both described in paragraph 5.2.

Koster (58°54'N., 11°01'E.), a summit, rises about 1.8 miles SSE of Klovningarna Light and is surmounted by the conspicuous ruins of two former lighthouses.

Directions.—The main approach route leading to the ports located at the inner side of Hvaler initially follows the inner coastal passage. This passage provides access to Loperen, which leads to Borg Harbor, and Sekken, which leads to Halden.

Vessels may approach the inner coastal passage by steering in an E direction from a position located about 2.3 miles NNW of Torbjornskjaer Light. They should pass N of Medfjordbaen and adjust course to pass close S of Testeinene Light. The white sectors of both Testeinene Light and Homlungen Light may be used.

From the vicinity of Testeinene Light, the inner passage leads 6 miles SE to the S entrance of Sekken. It passes NE of the Tisler group. The white sector of Norde Hallso Light and the white sector, astern, of Testeinene Light may be used.

Loperen (59°03'N., 10°58'E.), the channel lying between As-

maloya and Kjerkoy, leads N for about 6 miles from the inner coastal passage. The principal entrance route leads E of Vidgrunnen Light, E of Fugleskjaer Light, and W of Kvernskjaer.

Osterelva (59°09'N., 10°58'E.), a channel lying between the E side of Krakeroy and the mainland, leads 4 miles N from the N entrance of Loperen into Fredrikstad.

Rosvikrenna (59°10.5'N., 10°57.2'E.), a very narrow fairway, lies about 2 miles S of Fredrikstad. It extends for about 1 mile within Osterelva and is marked by a lighted range.

Caution.—The movement of water and the changing positions of the shallows within Rosvikrenna may effect the navigation of long vessels. Such vessels must use tugs when transiting this fairway.

Dredges and diving floats may often be encountered within Rosvikrenna.

Fredrikstad (59°12'N., 10°57'E.)

World Port Index No. 23840

4.33 Fredrikstad stands on both banks of the Glama River where it divides into two branches. Isegran, a small island, lies at the junction. Osterelva, leading S, is the E outlet and Vesterelva is the W outlet. The port forms part of Borg Harbor and serves an industrial area.

Fredriksta from S

Depths—Limitations.—The principal approach to the port is from S via Loperen and Osterelva. This route has a least depth of 11m, which lies in the vicinity of Rosvikrenna, and can be used by vessels with drafts up to 10.4m.

The route from W via Verterelva has a least depth of 5.8m and can be used by vessels with drafts up to 5.2m.

The Krakeroy Bridge, a bascule bridge, spans Vesterelva, about 0.3 mile NNW of Isegran, and has a vertical clearance of 9m, when closed. When open, it provides a navigable passage, 46.5m wide.

A high bridge spans the river about 0.6 mile NE of Isegran and has a vertical clearance of 39.5m (40m under the center).

The port has about 2,000m of total quayage and provides 48 berths. The main facilities are situated at the E side of Osterelva. These include Denofa-Lilleborg Quay, which is 380m long and has depths of 5.5 to 9.8m alongside; Orakaien South, which is 88m long and has depths of 9.8 to 10.6m alongside; and Orakaien North, which is 780m long and has depths of 8.4 to 10m alongside.

Fredrikstad

A ro-ro ramp, 29m wide, is located at the S end of Orakaien South and has depths of 9.5 to 11.2m alongside.

Holen Basin, located at the E side of Verterelva, has a quay, 375m long, with depths of 4.2 to 7m alongside.

The port has facilities for general cargo, container, ro-ro, bulk, and tankers. Vessels up to 213m in length and 10.4m draft can be accommodated.

A drydock, 287m long and 39.2m wide, is situated at the shipyard located off the E side of Verterelva and used for shipbuilding. It can handle vessels up to 130,000 dwt.

There are also extensive facilities for small craft, including three marinas.

Aspect.—Isegran, a small island, lies at the junction of Osterelva, Vesterelva, and the Glama River. It is connected to the shore by a bridge at the W side.

Pilotage.—For details of pilotage, see paragraph 4.28.

Regulations.—It is reported that a speed limit of 5 knots is in force within the port.

Vessels passing the ferry route, located about 0.2 mile above Isegran, must exercise caution and proceed at the slowest possible speed. Vessels planning to pass the ferry berth must sound one long blast on the whistle to announce their intention. This signal must be repeated just prior to the vessel reaching the berth.

Vessels entering Osterelva from Vesterelva must keep to the starboard side of the fairway.

Vessels approaching the Krakeroy Bridge with the current have navigational priority.

The port and approaches are situated within Sector 1 of the Oslofjorden VTS system. For further details, see Regulations under Oslofjorden in paragraph 4.28.

Caution.—Ferries cross the Glama River about 0.2 mile and 2 miles above Isegran.

During persistent W winds in the Skagerak, the water rises in the Glama River and may occasionally flood the quays.

The river is subject to siltation and depths may differ from those charted.

4.34 Sarpsborg (59°16'N., 11°06'E.) (World Port Index No. 23835) stands on the Glama River about 6 miles above Fredrikstad. The berthing facilities for ocean-going vessels are situated along the N side of the river, at Sandesund, close E of a sharp bend. The harbor serves both industrial and agricultural areas.

Tides—Currents.—The tidal range is only 0.3m at springs.

Generally, the current in the river does not affect navigation. However, during flood conditions, the flow can be bothersome in the approach to the harbor and tugs must be employed.

Depths—Limitations.—A bridge, with a vertical clearance of 30m, spans the river at Hustangen, close W of the harbor.

An oil quay is situated at Greaker, 2 miles WSW of the main harbor. It is 21m long and has mooring dolphins. The berth has depths of 11.1 to 12.1m alongside and can handle tankers up to 20,000 dwt and 10.4m draft.

A quay, 467m long, is situated at Alvim in the W part of the harbor. It has depths of 7.1 to 8.9m alongside and is equipped with a ro-ro ramp at the W end. Vessels with drafts up to 7.3m can reach this quay.

The main commercial quay at Sandesund is situated at Mellos, in the E part of the harbor. It is 280m long and has depths of 6.2 to 7.3m alongside. Vessels with drafts up to 6.1m can reach this quay.

Pilotage.—For details of pilotage, see paragraph 4.28.

Regulations.—The port and approaches are situated within Sector 1 of the Oslofjorden VTS system. For further details, see Regulations under Oslofjorden in paragraph 4.28.

4.35 Sekken (58°59'N., 11°04'E.), a channel, is entered close SE of Sekkefluene (Soekkefluene) Light (58°59.0'N., 11°03.4'E.) and leads NNE for about 7 miles to Singlefjorden. It is bordered by Herfol, Sondre Sandoy, and Nordre Sandoy, on the W side, and the mainland coast of Sweden, on the E side. The fairway within this channel, which is deep and almost free of dangers, forms the preferred route through Hvaler to Halden.

The border between Norway and Sweden is situated approximately along the center of this channel. Several beacons, which are not intended for navigation, stand on the mainland shore of the channel and indicate this border.

Nord Hallso Light (58°58'N., 11°05'E.) is shown from an island lying at the E side of the junction of Kosterfjorden and Sekken, 1.2 miles SSE of Sekkefluene Light. For a description of the waters and coast lying S of this light, see Sector 5.

Glan Light (59°00'N., 11°04'E.) is shown from a structure standing on the S end of an islet, 0.7 mile NNE of Sekkefluene Light.

A conspicuous beacon, 30m high, stands about 0.2 mile NNW of the S extremity of Herfol. Another beacon is situated on the largest islet of Gylteholmane, a group of islets lying near the SE side of Herfol.

Reiertangen Light (59°01'N., 11°07'E.) is shown from a structure standing on the E side of Sondre Sandoy, 2.6 miles NE of Sekkefluene Light.

Halle Vagnaren rises on the mainland 1.4 miles NE of Reiertangen Light. This hill is 120m high and conspicuous.

Kattholmen (59°04.7'N., 11°09.2'E.), an islet, lies in the N part of the channel, 3 miles NNE of Reiertangen Light, and is marked by a light at its SE side. A detached bank, with two above-water rocks, lies close NNW of this islet.

Ostre Rodskjaer, a small and low islet, lies near the middle of the channel, about 1 mile SW of Kattholmen. A shallow reef fringes its NW side and is marked by a perch.

Singlefjorden (59°05'N., 11°10'E.) extends N for about 6 miles from the N end of Sekken and is of no commercial significance.

Haslauflu Lighted Beacon (59°06'N., 11°10'E.) is shown from a rock lying near the middle of the entrance to Singlefjorden, 2.8 miles N of Kattholmen.

Directions.—Vessels entering Sekken should steer a midchannel course and pass SE of Glan Light and ESE of Reiertangen Light. In the N part of the passage, vessels should keep near to the mainland, which is steep-to, and pass ESE of Ostre Rodskjaer and ESE of Kattholmen.

Vessels can also approach Sekken from S via Koster Fjorden. This route is described in paragraph 5.4.

Two channels lead through Hvaler from the W side of the entrance to Singlefjorden and connect with Osterelva and Fredrikstad. They may only be used by small vessels with local knowledge.

4.36 Svinesund (59°05'N., 11°14'E.), a narrow channel, is entered about 2 miles NE of Kattholmen. It extends in an ENE direction for about 2.5 miles to the W end of Ringdalsfjorden. The shores on both sides of the channel slope steeply and are wooded.

Svinesund from W

Sponvikskansen Light (59°05.3'N., 11°13.6'E.) is shown from a structure standing on the N side of the entrance to Svinesund.

A fixed bridge, with a vertical clearance of 58m over a width of 50m, spans the channel about 1.5 miles ENE of Sponvikskansen Light. A lighted fairway leads under this bridge.

It is reported that a bridge, with a vertical clearance of 55m, has been constructed about 1 mile E of Sponvikskan-sen Light.

Ringdalsfjporden (59°06'N., 11°18'E.), a clear channel, leads about 1.5 miles ENE and connects the E end of Svinesund to the N end of Idefjorden.

The border between Norway and Sweden lies approximately in the center of the channel leading through Svinesund and

Ringdalsfjorden. Beacons indicating the boundary stand in various places along the shores but have no navigational significance.

Knivsoya is the largest islet of a group lying near the E end of Ringdalsfjorden. It is situated 1.9 miles ENE of the fixed bridge and is marked by a light on the SE side.

Svarte Jan Light (59°06.7'N., 11°19.5'E.) is shown from a floodlit structure standing on the Swedish mainland close S of Knivsoya. The main fairway narrows in this vicinity and leads between this light and the S extremity of Knivsoya.

Ice.—The channel leading through Svinesund and Ringdalsfjorden is usually kept open throughout the year with the help of icebreakers.

Tides—Currents.—In fine weather, the incoming and outgoing tidal currents are fairly regular and attain a rate of 3 to 4 knots; however, this also depends on the weather conditions.

Depths—Limitations.—The least depth in the fairway leading through Svinesund and Ringdalsfjorden is 8.5m. Vessels with drafts up to 7.6m can transit these channels.

Halden (59°07'N., 11°23'E.)

World Port Index No. 23850

4.37 Halden is situated at the E end of Ringdalsfjorden in the area formed with the junction of Idefjorden. The town stands on the land sloping gently down to the mouth of the Tistedalselva River. The port, which is divided into inner and outer harbors, serves an industrial area.

Halden

Brattoya, an island, lies in the approach to the port. Sauoya, another island, lies in the E part of the port and is connected at its N end to the mainland by a short causeway.

Ice.—Ice forms in the harbor every winter but usually the channels and berths are kept open by icebreakers.

Tides—Currents.—Generally, the tidal range is about 0.3m.

Depths—Limitations.—The least depth in the approaches to the port is controlled by the fairway passing through Svinesund and Ringdalsfjorden. The port has about 1,000m of total quayage.

The inner harbor, with depths of 6 to 8m, lies between the E side of Sauoya and the mainland. It provides seven berths. The main berth is 124m long and has depths of 4.2 to 5.3m alongside. The channel leading to this harbor has a depth of 6.6m but is subject to siltation.

The outer harbor, with depths of 13 to 18m, lies between Brattoya and Sauoya. It can be approached by passing either N or S of Brattoya. The N passage, which is used generally by smaller vessels, has a least depth of 7.2m.

The outer harbor provides six berths. Ytre Molbrygga, the main berth, is 264m long and has depths of 6.5 to 8.7m alongside.

There are facilities for general cargo, container, tanker, and bulk vessels. Vessels up to 170m in length, 21m beam, and 7.6m draft can be accommodated.

Pilotage.—Pilotage services in the outer approaches are provided by Borg Harbor and arranged through the Oslofjorden Booking Center (see paragraph 4.1 and paragraph 4.28). Pilotage in the port is compulsory for foreign vessels. Harbor pilots can be contacted by VHF and generally board vessels, if requested, off Sponvika (59°05.5'N., 11°14.0'E.), which is situated on the N side of the channel near the W entrance to Svinesund. Pilots may also board in the outer approaches about 1 mile WSW of Vidgrunnen Light (59°01.6'N., 10°57.5'E.) or, by appointment, near the SE end of Herfol, close SE of Sekkefluene Light (58°59.0'N., 11°03.4'E.).

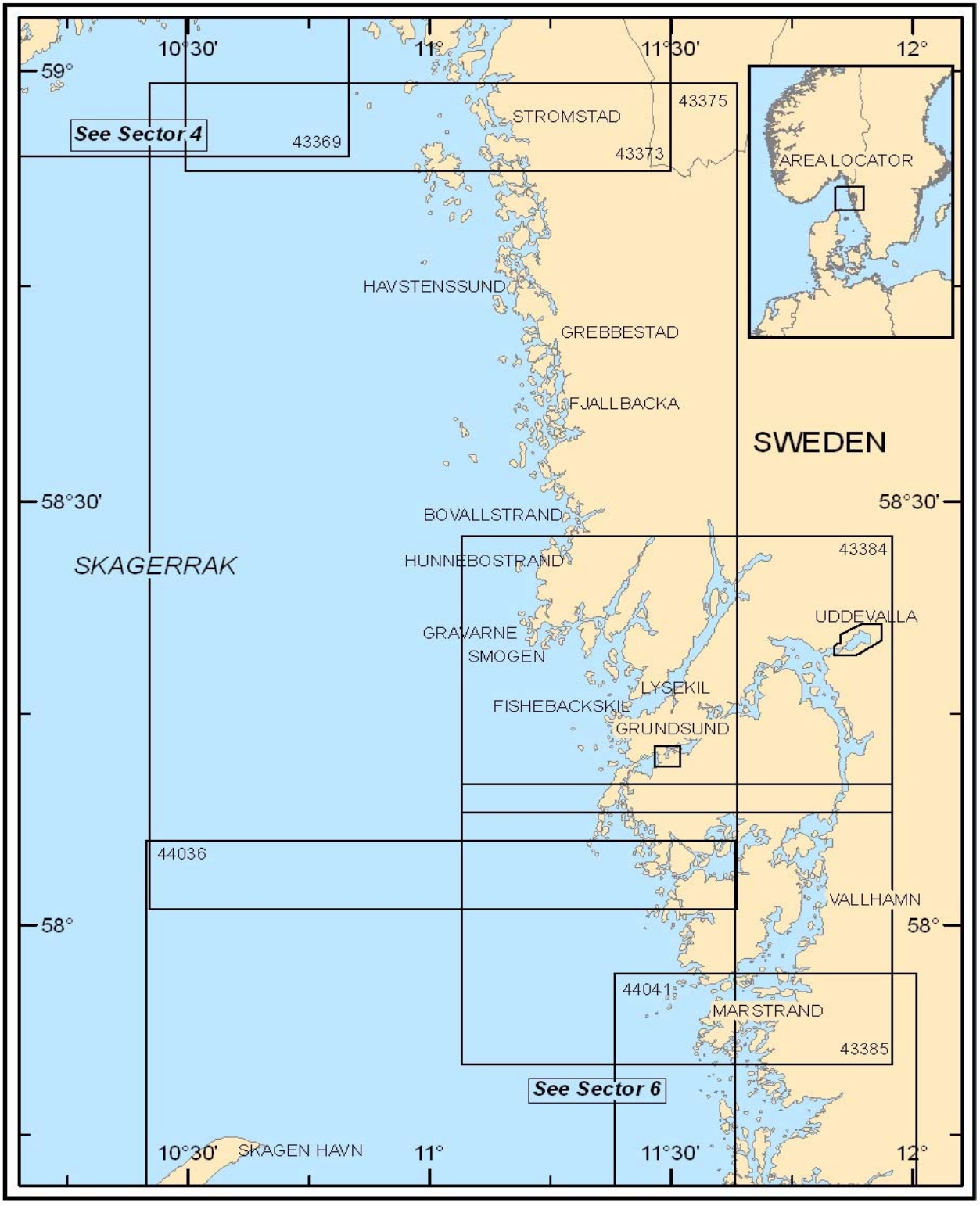
Anchorage.—Vessels waiting for slack water in Svinesund anchor in Singlefjorden. Within the harbor of Halden the best anchorage is E of Brattoy, in depths of 13 to 16m, mud and sand.

4.38 Idefjorden (59°03'N., 11°25'E.) extends about 9 miles SSE from the E end of Ringdalsfjorden. This fjord is nearly free of dangers but it becomes shallow about 1 mile from the head. The shores are heavily wooded and most of the small bays indenting them are overgrown by weeds.

The border between Norway and Sweden lies approximately in the center of the channel leading through the fjord.

Skysskaffen Light (59°06.0'N., 11°22.5'E.) is shown from a structure standing on the E shore of the fjord, about 1.2 miles S of Halden Harbor.

A number of former granite-loading places are situated along the shores of this fjord, but the facilities are in poor condition. It is reported that no places of commercial significance are located in the fjord and all cargo is handled at Halden.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **5** — CHART INFORMATION

SECTOR 5

SWEDEN—WEST COAST—SEKKEN TO MARSTRANDSFJORDEN

Plan.—This sector describes the NW coast of Sweden between Sekken, a waterway, and the entrance to Marstransfjorden, about 65 miles SSE, including the approaches to Uddevalla. The descriptive sequence is from N to S.

General Remarks

5.1 The stretch of the W coast of Sweden covered by this sector is fronted by "Skargard," a belt of islands, islets, and rocks which extends from 4 to 8 miles seaward.

Although the coast is very irregular, the fjords do not extend far inland and the scenery, compared to that of Norway, is less interesting. The rocky elevations on the mainland are separated by long narrow valleys. These valleys, which are composed of clay floors, produce a great deal of cultivation.

Navigation within the dangers of the Skargard is intricate and vessels require local knowledge.

Ice.—Ice normally forms in the inner leads, fjords, and several harbors located within the area described in this sector.

Pilotage.—Generally, pilotage is compulsory along certain fairways connecting ports along the coast in Swedish waters. Vessels subject to compulsory pilotage vary in size and type according to location; these vessels are divided into the following categories:

1. Category 1—Vessels carrying or with uncleaned tanks which last carried:
   a. Liquefied gas.
   b. Liquid chemicals defined in MARPOL73 Supplement 2, Annex 2 as category A, B, or (if vessel does not have a double-skin hull under all cargo tanks) C.
   c. Liquid chemicals which, according to the IMO bulk chemical code, should be carried in Type 1 or 2 vessels.
2. Category 2—All other chemical tankers which are laden or have uncleaned tanks and all laden oil tankers.
3. Category 3—All other vessels.

For further details, see Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

It is reported that extensive changes to pilotage pro-cedures and VTS systems have been carried out in regard to the ports described within this sector. Generally, initial ordering of pilots for ports described within this sector should be carried out via the Swedish Vessel Reporting System (FRS) on the Swedish Maritime Administration internet website.

In exceptional cases, pilots may be ordered by e-mail, telephone, fax, or VHF. A preliminary request for pilotage should be made at least 24 hours in advance. A definitive request for pilotage must be made via the Pilot Request System at least 5 hours in advance. For additional information, see the following internet website:

Swedish Maritime Administration Home Page
http://www.sjofartsverket.se

Regulations.—Under reglatory directives of the EU, the Swedish Maritime Administration (SMA) has established a Vessel Reporting System (FRS) for all vessels 300 grt and over that are bound for Swedish ports or anchorages within Swedish waters. Information regarding arrival, departure, the carrying of dangerous or polluting goods, and the delivery of ship-generated waste must be forwarded in advance by the vessel or agent. For further details, see Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

Commercial vessels in Swedish territorial waters, when in the company of Swedish warships in daylight or when within 1 mile of any restricted or semi-restricted areas, are required to hoist their national flag. When at anchor in the company of Swedish warships, the national flag shall be hauled down.

Special regulations are in force with regard to the presence of aliens and foreign vessels within certain restricted and semi-restricted areas fronting the coast. Generally, foreign ships may, without permission, make use of the main channels, shipping lanes, and fairways within the restricted and semi-restricted areas. Foreign ships may also, without permission, remain within these areas for a maximum of 72 hours successively at an anchorage or mooring. For further details, see Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

Several Restricted Military Areas have been established along the coast for the protection of defense installations. Under normal circumstances, foreign vessels may stay in these areas without special permission. However, during times of increased military tension, special regulations, promulgated by the Swedish authorities, will apply.

Such an area lies within the South Channel leading to Uddevalla in the vicinity of Algon (57°55'N., 11°40'E.).

Certain islets and rocks, listed below, have been designated Seal Protection Areas. During the period from 15 May to 15 July anchoring within 100m or landing on these islets is prohibited.

Within the arc covered by this sector, the following islets are designated as seal protection areas:

1. Sockna (58°50.8'N., 11°00.4'E.).
2. SV Ramsokalv (58°49.3'N., 11°01.8'E.).
3. Segelskaren (58°46.7'N., 10°59.2'E.).
4. Norra Vaderoarna (58°35.0'N., 11°02.0'E.).
5. Bredviksskaren (58°17.6'N., 11°22.5'E.).
6. Gaso-skargarden (58°15.0'N., 11°21.5'E.).
7. Lynholmarna (57°52.8'N., 11°40.5'E.).
8. SV am Tornholmen (57°50.2'N., 11°39.0'E.).

Directions.—From a position located about 3 miles SSE of Faerder Light (59°02'N., 10°32'E.), the coastal route leads SSE for about 45 miles to a position located about 6 miles WSW of Hallo Light (58°20'N., 11°13'E.). It lies in deep water outside the 50m curve and passes about 8 miles SW of Ramskar Light (59°45'N., 11°00'E.).

From WSW of Hallo Light, the route leads SSE for 29 miles

to a position located about 4 miles SW of Hatteberget Light (57°52'N., 11°28'E.). It lies in deep water outside the 50m curve and passes about 4 miles WSW of Maseskar Light (58°06'N., 11°20'E.).

An inner coastal passage, used by small vessels with local knowledge, leads inside "Skargard." It leads generally in a S direction for 35 miles from the junction of Sekken and Kosterfjorden to Hallo Light. It then continues through the islands and dangers fronting the mainland, passing N and E of Malmon Island (58°20'N., 11°20'E.), to the vicinity of the entrance to Gullmarnsfjord.

Archipelago routes lead through the dangers fronting the mainland coast and are well sheltered. The channels, which are used by local coasters, small craft, and fishing vessels, are intricate and very narrow in places. Local knowledge is required.

Caution.—Due to the residual danger of the possible existence of bottom mines laid during WWII, vessels are cautioned against anchoring or fishing within several former NEMEDRI mine danger areas, which are located along the coast. For further information, see Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

Because the off-lying dangers are steep-to, soundings give very little warning of danger when approaching this stretch of coast in thick weather.

Sekken to Hallo Light

5.2 **Nord Hallso Light** (58°58.0'N., 11°05.3'E.) is shown from a structure standing on an island of the same name. This island lies at the E side of the junction of Kosterfjorden and Sekken, 1.2 miles SSE of Sekkefluene Light (58°59.0'N., 11°03.4'E.).

The island can be easily identified by its reddish-yellow color, its two hummocks, and a large white square mark, with a black border, painted on a steep slope in its N part.

Tjuholmskappen Light is shown from a structure standing on an islet 0.7 mile NE of Nord Hallso Light.

Kosteroarna (58°55'N., 11°00'E.) is an extensive group of islands, islets, and rocks which fronts the mainland and may best be seen on the chart. It lies centered about 6 miles SSW of Nord Hallso Light.

Nord Koster and Syd Koster (Sor Koster) are the largest islands in this group. In hazy weather, they are often visible at a greater distance than the mainland. These islands are practically devoid of trees and, being of a dark color, appear in sharp contrast against the lighter coast behind them.

A number of small harbors and marinas are situated within Kosteroarna. They are mostly used by fishing vessels, small craft, and local ferries. The main harbors include the following:

1. Ramsohavn (58°50'N., 11°04'E.).
2. Brevik (58°52'N., 11°02'E.).
3. Korshamn (Ekenas).
4. Nordkoster (58°54'N., 11°01'E.).

Klovningarna Light (58°56'N., 11°00'E.), equipped with a racon, is shown from a tower, 6m high, standing on the easternmost of two islets at the N end of Kosteroarna.

Koster (58°54'N., 11°01'E.), the summit of Nord Koster, rises about 1.8 miles SSE of Klovingarna Light and is 59m high. It is surmounted by the ruins of two conspicuous former lighthouses.

Valtjallet, a prominent hill surmounted by a beacon, rises on Syd Koster, 1.2 miles SSE of Koster. A conspicuous chapel is situated close NE of this hill.

5.3 **Grisbadarna** (58°54'N., 10°57'E.), a group of rocky shoals, extends about 6 miles W and 4 miles SW from Klovingarna Light. This group, which may best be seen on the chart, has depths of 2 to 10m and is marked by buoys. The sea breaks on these shoals during heavy weather.

Grisbadarna SV Lighted Buoy (58°53.8'N., 10°49.3'E.), moored about 5.6 miles WSW of Klovingarna Light, marks the outer dangers at the W end of this group.

Ursholmen (58°50'N., 11°00'E.), the largest islet in the SW part of Kosteroama, lies 6 miles S of Klovingarna Light and is dark colored. A light is shown from a prominent tower, 13m high, standing on the W side of this islet. A conspicuous disused light tower is situated close NW of the light.

Ursholmen Light

Ursholmen Disused Light Tower

Bredgrunden, a rock awash, lies 1.2 miles WNW of Ursholmen Light and is marked by a buoy. Erikslacken, a detached shoal, lies about 1.3 miles WSW of Ursholmen Light and has a least depth of 7m. These two dangers are the outermost in this vicinity.

Ramso (58°50'N., 11°04'E.), the largest island in the SE part of Kosteroarna, is located 2.5 miles E of Ursholmen Light.

Directions.—A route, which may best be seen on the chart, leads NE through the dangers lying in the N part of Kosteroarna and into the N end of Kosterfjorden. It is entered about 4.5 miles SW of Klovingarna Light and initially indicated by the range formed by Nord Hallo Light and Tjuholmskappen Light. This route then passes close SE of Klovingarna Light.

The fairway may be used by vessels up to 12,000 dwt and 8m draft; however, numerous shallow dangers lie close adjacent to it. This route should not be used during heavy weather or reduced visibility.

Caution.—Fishing vessels may be encountered in the vicinity of the route leading through the N part of Kosteroarna.

5.4 Ramskar Light (58°45'N., 11°00'E.), equipped with a racon, is shown from a prominent tower, 19m high, standing on a large isolated rock lying 4.5 miles S of Ursholmen Light. It marks the S end of a group of islets and shallow shoals, which extends S from Kosteroama and may best be seen on the chart.

Ramskar Light

A shoal bank, with depths of 7.4 to 14m, extends about 1 mile S from the light and is marked by a buoy.

Spiran, a detached shoal bank, lies centered about 2 miles SSE of Ramskar Light. It has depths of 7.6 to 12m and is marked by a buoy at the N end.

Persgrunden (58°42'N., 10°51'E.), a group of dangerous shoals with depths of 2.4 to 15m, lies centered about 5 miles SW of Ramskar Light. The outermost shoal patch has a least depth of 7.4m and is marked by a lighted buoy.

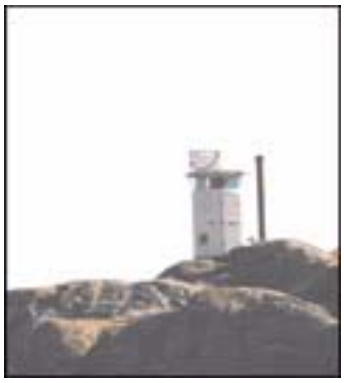
Koster Fjorden (58°52'N., 11°06'E.) lies between the islands and islets fringing the mainland and the E side of Kosteroarna. It connects the waters of Olsofjorden, at the S end of Sekken, to the Skagerrak. This channel forms part of the inner coastal passage. The fairway, which is authorized for drafts up to 10m, is deep and comparatively clear of dangers.

Sneholm Light (58°53.5'N., 11°03.9'E.) is shown from a prominent tower, 11m high, standing on an islet lying at the W side of the channel, 4.5 miles S of Nord Hallso Light.

Kibblingarna (58°55'N., 11°05'E.), a small group of islets, lies at the E side of the channel, 1.6 miles NE of Sneholm Light. A light is shown from the E end of the southernmost islet.

Sneholm Light

Vattenholmen Light (58°52.5'N., 11°06.4'E.) is shown from a structure standing on an islet lying at the E side of the channel, 1.7 miles SE of Sneholm Light.



Vattenholmen Light

Svangen Light (58°47.9'N., 11°07.1'E.) is shown from a structure standing on the N part of an islet lying at the E side of the channel, 4.5 miles S of Vattenholmen Light. A prominent dwelling is located near the light.

Svangen Light

A number of small harbors and marinas are situated within Koster Fjorden. They are used by fishing vessels, small craft,

and local ferries. The main harbors include Kungsvikshamn (59°00'N., 11°08'E.) and Reso (58°48'N., 11°10'E.).

Directions.—The channel can be approached from N, W, and S. The N approach uses the route leading to the ports located in the inner side of Hvaler. The W approach uses the route leading through the N part of Kosteroarna.

The S approach uses either of two routes which pass SE or ESE of Ramskar Light. From a position located about 4 miles SSE of Ramskar Light, the direct route from S leads in an ENE direction for 8 miles, using the white sector of Vattenholmen Light, to the S entrance of Koster Fjorden.

After passing about 1 mile S of the S end of Persgrunden, the route from SW leads in a NE direction for 8 miles to join the direct route from S. It uses the white sector of Svangen Light and passes between the shoal extending S from Ramskar Light and Spiran.

Several channels also lead through the dangers lying between Ursholmen Light and Ramskar Light. These channels are recommended for only small craft and fishing vessels with local knowledge.

Caution.—Several submarine cables, which may best be seen on the chart, extend across Koster Fjorden in the vicinity of Sneholm Light.

5.5 Stromstad (58°56'N., 11°10'E.) (World Port Index No. 23870) is situated on the mainland at NE side of Koster Fjorden. The harbor is divided into two coves known as Norra Hamnen and Sodra Hamnen. Sodra Hamnen is protected from S by a breakwater, which connects an islet to the mainland.

Winds—Weather.—Generally, the prevailing winds are from W to SW. With strong W winds, especially during fall, a disturbed sea may form in the harbor in combination with HW. Morning fog is prevalent from February to April due to S winds.

Ice.—Ice is usually not a problem in the harbor. However, during severe winters, some vessels may be hindered in February.

Tides—Currents.—The tidal range is about 0.3m. The water level is also affected by metrological conditions. Winds from W raise the water level and those from E cause it to fall.

Depths—Limitations.—Norra Hamnen provides six berths and is used by local ferries and coasters. The main berth is 100m long and has depths of 2.5 to 4m alongside.

Sodra Hamnen, divided from Norra Hamnen by a small peninsula, is used by fishing boats and small craft. The main berths are 200m long, with depths of 4 to 8m alongside, and 80m long, with depths of 6 to 9m alongside.

A ro-ro berth is situated 0.2 mile S of the breakwater. It is 60m long and has a depth of 7m alongside. A dolphin at the S end extends the length of the berth to 75m.

The port has facilities for coasters, fishing boats, ferries, pleasure craft, small craft, ro-ro vessels, and tankers. Generally, vessels up to 3,000 dwt and 7.3m draft are accommodated in the harbor.

A tanker terminal quay is situated at Roseberg, 0.6 mile S of the entrance to Sodra Hamnen. It is 80m long and has a depth of 13.5m alongside. Tankers up to 40,000 dwt and 8m draft can transit the entrance channel and be accommodated during daylight. At night, tankers are limited to 20,000 dwt and 7.6m draft.

With prior notice and the use of additional fairway markings, tankers with drafts up to 11.5m can transit the entrance channel and be accommodated during daylight.

Pilotage.—Pilotage to Stromstad is compulsory for the following vessels (see paragraph 5.1):

1. All Category 1 vessels.
2. Category 2 vessels of 80m length or 15m beam and over.
3. Category 3 vessels of 90m length or 16m beam and over.

Generally, initial ordering of pilots should be carried out via the Swedish Vessel Reporting System (FRS) on the Swedish Maritime Administration internet website (see paragraph 5.1). In exceptional cases, pilots (call: Stromstad Pilot) may be ordered by telephone or on VHF channel 22. A preliminary request for pilotage should be made at least 24 hours in advance. A definitive pilotage request must be made via the Pilot Request System at least 5 hours in advance.

Pilots may be contacted by VHF and board in the following positions:

1. About 1.2 miles WNW of Brofjordens Angoring Lighted Buoy (58°15'N., 11°13'E.).
2. In Koster Fjorden, 0.9 mile N of Sneholm Light.
3. In the fairway 1.5 miles S of Ramskar Light.
4. About 0.8 mile WNW of Nord Hallso Light.

Regulations.—A Vessel Traffic Service (VTS) system operates in the approaches to the coast in the vicinity of Stromstad. The VTS area limits are indicated by a line joining the following positions:

1. Vajern (58°23.0'N., 11°15.7'E.).
2. Sejebaden Lighted Buoy (58°21.0'N., 11°09.3'E.).
3. Vaderobod Light (58°32.5'N., 11°02.0'E.).
4. GB4 Buoy (58°55.8'N., 10°50.8'E.).
5. The international Norwegian/Swedish border to latitude 58°58.0'N then E to the mainland.

The VTS system is mandatory for all vessels of 45m in length and over, all vessels of 300 grt and over, and all tows over 45m in length.

All participating vessels should report to the VTS Control on VHF channel 11, as follows:

1. 30 minutes prior to entering the VTS area (voluntary for vessels equipped with AIS). Vessels must state their name, call sign, position, and destination.
2. On entering the VTS area or immediately prior to leaving a quay or anchorage. Vessels must state their name, call sign, position, intended route, destination, and draft.
3. On arrival at a quay, when changing route, when anchoring, on the occurrence of any defects which may affect the safety of navigation, or on leaving the area. Vessels must state their name, position, and destination.

The Stromstad VTS Control provides information on traffic in the area and other navigational details, including ice conditions and passage limitations. The VTS Control can be contacted by e-mail, as follows:

westcoastvts@sjofartsverket.se

All vessels within the VTS area must maintain a continuous listening watch on VHF channels 11 and 16.

Directions.—Three approach channels, for which local

knowledge is required, lead through the dangers fronting the mainland from Koster Fjorden to the port.

The channel leading from NNW is entered about 1 mile E of Nord Hallso Light. It is authorized for drafts up to 6m but narrows to a width of only 45m at the S end.

The channel leading from WSW is entered by passing N or S of Kibblingarna. It is authorized for drafts up to 6m.

The main entrance channel leads from W and is authorized for drafts up to 9m. The fairway is entered about 1.5 miles S of Nord Hallso. It is winding but well marked.

Caution.—A submarine pipeline extends SW for about 250m from the NE side of Norra Hamnen.

5.6 Vacker Light (58°42.7'N., 11°09.7'E.) is shown from a prominent tower, 13m high, standing on a rock lying close off the mainland, 6 miles WSW of Ramskar Light. Dangers fronting the coast extend up to about 3 miles WNW, 2.3 miles W, and 1.3 miles SW of this light.

Vacker Light

Bramskar Light (58°39.2'N., 11°09.5'E.) is shown from a structure standing on an islet lying 3.6 miles S of Vacker Light. Moro, a yellowish-colored small island, lies about 0.5 mile NNW of the light and its summit is surmounted by an edifice of stones.

Otteron Island, situated 2 miles E of Bramskar Light, is high and dark, with some trees growing on its sides. Pinno Island lies close NW of Otteron Island.

Stangeskar Light (58°39.6'N., 11°11.6'E.) is shown from a tower, 7m high, standing on the NE end of an islet lying 1.2 miles ENE of Bramskar Light.

Djupskar Light (58°38.2'N., 11°11.7'E.) is shown from a tower, 6m high, standing on a rock lying 1.6 miles SE of Bramskar Light.

Sodra Syster Light (58°35.6'N., 11°09.2'E.) is shown from a prominent tower, 9m high, standing on a rock lying 3.7 miles S of Bramskar Light.

A number of small harbors and marinas are situated within fjords along the mainland coast between Svangen Light and Bramskar Light. They are used only by fishing vessels, small craft, and local ferries. The main harbor is Havstenssund (58°45'N., 11°11'E.), which may be approached through channels leading from SSW and NNW. Local knowledge is required.

5.7 Grebbestad (58°41'N., 11°16'E.) (World Port Index No. 23890), a small harbor and loading place, is located at the head of an inlet about 3.6 miles NE of Bramskar Light. The main approach channel from seaward, which is authorized for drafts up to 4.5m, leads in an ENE direction. It passes close S of Bramskar Light and between Otterron Island and Pinno Island. Local knowledge is required. The harbor provides three commercial berths. The main berth is 80m long and has a depth of 5m alongside. The harbor is used mostly by coasters, fishing boats, and pleasure craft.

Fjallbacka (58°36'N., 11°17'E.) (World Port Index No. 23900), a small harbor and loading place, is situated in a bay on the mainland, about 4 miles E of Sodra Syster Light. The main approach channel, which is narrow and winding, leads in an E direction and is authorized for drafts up to 7.3m. It is entered close N of Sodra Syster Light. Local knowledge is required.

The harbor is used mostly by coasters, fishing boats, and small craft. It provides two commercial quays. The main berth is 95m long and has depths of 4.8 to 5m alongside.

Small vessels can anchor off the harbor, in depths of 8 to 10m, good holding ground.

Valo Sadlar, 68m high, rises 1 mile W of Fjallbacka and is the summit of Valon Island. It has two small peaks separated by a cleft and is conspicuous from seaward.

5.8 Vaderoarna (58°34'N., 11°04'E.) is a large group of islands, islets, and rocks which fronts the mainland and may best be seen on the chart. It lies centered 3.5 miles SW of Sodra Syster Light.

Vaderobod Light (58°32.4'N., 11°01.8'E.), equipped with a racon, is shown from a prominent tower, 19m high, standing on the S side of a small, high island in the SW part of Vaderoarna, 5 miles SW of Sodra Syster Light.

Skalholmen Light (58°32.5'N., 11°05.7'E.) is shown from a tower, 9m high, standing on the E extremity of an islet lying in the SE part of Vaderoarna, 2 miles E of Vaderobod Light. Lygno, a small island, lies close NW of the light and is marked by a beacon.

Regulations.—There is a speed limit of 5 knots within the harbor and 7 knots in the approaches.

The islands within Vaderoarna are predominately a reddish-brown color and not easily distinguishable from those fringing the mainland coast. Storo, the highest and largest island, lies in the NE part of the group, 2.4 miles NNW of Skallholmen Light. A disused lookout tower stands on its S part. A prominent beacon is situated on an islet lying close SE of the S extremity of Storo.

Kilen, a shoal patch, lies on the NW side of Vaderoarna about 4.3 miles NNW of Vaderobod Light. It has a least depth of 4.5m and is marked by a buoy.

Knappesten, a shoal with a depth of 8m, lies at the N end of the group about 4 miles NNE of Vaderobod Light.

Skalgrund, a rocky patch, lies at the S end of the group about 1.5 miles SE of Vaderobod Light. It has a least depth of 2m and is marked by a light.

Bockern, a detached shoal with a depth of 9m, lies at the SW end of the group about 1.8 miles S of Vaderobod Light.

During W gales, the sea breaks heavily on the outer dangers in this group.

5.9 Vadero Fjorden (58°33'N., 11°07'E.) is the channel lying between the E side of Vaderoarna and the dangers fringing the mainland coast. The fairway is authorized for drafts up to 10m.

Stora Ryggen, a detached shoal patch, lies in the N part of the channel. It has a least depth of 4.4m and is marked by a buoy. This shoal lies about 1.3 miles W of Sodra Syster Light and forms the westernmost danger in this vicinity. Vessels transiting the channel are advised to pass about 0.3 mile W of this shoal.

Stora Haskar, a high and yellowish-red islet, lies on the SE side of Vadero Fjorden. It is situated about 2.3 miles E of Skalholmen Light and is conspicuous when approaching the channel from SW.

Sote Fjorden (58°29'N., 11°10'E.), the water area lying S of Vadero Fjorden, extends S as far as Mjolskar Light.

Saltskar, an islet, lies in the NE part of Sote Fjorden, about 4.4 miles ESE of Skallholmen Light, and is marked by a conspicuous beacon, which appears as a figure of an old woman. Kalen, a reef awash at LW, lies about 1.8 miles WSW of Saltskar and is marked by a buoy.

Mjolskar Light (58°24.9'N., 11°11.6'E.) is shown from a prominent tower, 14m high, standing on the NE end of an islet lying at the SE end of Sote Fjorden, 9.3 miles SE of Vaderobod Light.

Mjolskar Light

Soreskar, a light-colored high islet, lies 0.7 mile NNW of Mjolskar Light and is prominent from seaward. Sote Bonde, a light brown hill, rises on the mainland 1.2 miles ENE of Mjolskar Light. It is 58m high and prominent from SW.

Lerberget, a detached shoal with a least depth of 5.3m, and Mickelbaden, a detached shoal with a least depth of 8m, lie about 1.2 miles WSW and 1.4 miles NW, respectively, of Mjolskar Light. These two shoals form the outermost dangers in this vicinity.

During W gales, the sea breaks heavily on the outer dangers lying along the E side of Sote Fjorden.

5.10 Hallo Light (58°20'N., 11°13'E.) is shown from a prominent floodlit tower, 20m high, standing on a small island lying about 4.7 miles S of Mjolskar Light. Salo, an islet, lies 0.4 mile WNW of Hallo Light and a prominent beacon and a cairn stand near its center.

Hallo Light

Smogen Island lies 1.3 miles N of Hallo Light and a prominent lookout tower, 7m high with a pointed roof, stands in its S part. A conspicuous water tower is situated 0.2 mile NNE of this tower.

Sejebaden, a detached shoal patch, lies about 2.1 miles WNW of Hallo Light. It has a least depth of 5.9m and is marked by a lighted buoy. Det Grunda, a detached shoal with a least depth of 7m, and Svaberget, a detached shoal bank with a least depth of 11m, lie about 3.1 miles and 4.7 miles, respectively, WNW of Hallo Light. These three shoals form the outermost dangers in this vicinity.

A number of small harbors and marinas are situated on the mainland at the E side of Vadero Fjorden and Sote Fjorden. They are used only by fishing vessels, small craft, and local ferries. The main harbors include the following;

1. Hamburgsund (58°33'N., 11°16'E.).
2. Smogen (58°21'N., 11°14'E.).
3. Hasselosund (58°22'N., 11°14'E.).
4. Fisktangen (58°22'N., 11°16'E.).

Caution.—Winds from S usually cause a strong N current in the vicinity of Hallo Light and caution is advised.

A circular area, within which all bottom activities are prohibited, lies centered about 17.5 miles SW of Hallo Light. This area has a radius of 0.5 mile and may best be seen on the chart.

5.11 Bovallstrand (58°29'N., 11°20'E.), a small harbor and loading place for stone, is situ-ated on the S side of an inlet, 5.4 miles NE of Mjolskar Light. The harbor provides three commercial berths. The main berth is 48m long and has a depth of 4m alongside. The main approach route leads from NNW and is authorized for drafts up to 8m. Local knowledge is required. The harbor is used by coasters and small craft.

Sparo Klofva (Sparodklavan), a hill, rises 0.9 mile ENE of Bovallstrand and is 111m high. It has a cleft between two peaks and is conspicuous from seaward.

Hunnebostrand (58°26'N., 11°18'E.) (World Port Index No. 23910), a small harbor and loading place, is situated on the E part of Osofjorden, 3.5 miles NE of Mjolskar Light. It may be approached from seaward from the SW or the WNW. The channel leading through the off-lying dangers from WNW is entered about 3 miles N of Mjolskar Light and is indicated by a lighted range. The entrance fairway is authorized for drafts up to 4m. Local knowledge is required.

The harbor provides six berths. The main berths include

Sodra Kajen, which is 75m long and has depths of 4.5 to 5m alongside, and Angbatsbryggan, which is 120m long and has depths of 4 to 4.5m alongside. The harbor is used by small commercial vessels, fishing boats, and pleasure craft.

Sotenkanalen leads from the vicinity of Hunnebostrand to Kungshamn (58°22'N., 11°15'E.), 5 miles SSW. This canal, which is 3 miles long, is spanned by a swing bridge and has a bottom width of only 15m. It is authorized for drafts up to 4m.

Kungsham (58°22'N., 11°15'E.), a large fishing harbor, is situated at the W side of a peninsula, about 1.8 miles NNE of Hallo Light. The main approach channel, which is authorized for drafts up to 8m, leads NNE through the dangers fringing the coast. It is entered about 1.2 miles S of Hallo Light and is indicated by a lighted range. Local knowledge is required.

The harbor provides seventeen berths and has extensive facilities for fishing vessels. The main berths include Gulskarshamnen, which is 130m long and has a depth of 8m alongside; Fish Berth, which is 144m long and has a depth of 5m alongside; and North Harbor Berth, which is 58m long and has depths of 5 to 5.5m alongside.

A conspicuous radio mast, 75m high, stands in the vicinity of the harbor.

Caution.—The approaches to Kungshamn lie within the Lysekil VTS system area (see paragraph 5.15).

Hallo Light to the Approaches to Uddevalla

5.12 Malmo Fjord (58°18'N., 11°14'E.), the water area lying S of Hallo Light, forms the outer approaches to Ornefjorden, Abyfjorden, and Brofjorden.

Malmon, an island, lies close S of the mainland coast 3.5 miles E of Hallo Light. The water area between is encumbered by numerous islets, rocks, and shoals which may best be seen on the chart.

Sodra Astebrott, a shoal with a least depth of 1.6m, lies at the S end of a chain of shoals, 1.4 miles SSE of Hallo Light. This shoal is marked by a buoy and a detached patch, with a depth of 9.8m, lies about 0.5 mile SE of it. These shoals form the outermost dangers in this vicinity.

Sorgrundsberg (58°17'N., 11°11'E.), a detached shoal bank, lies about 3.1 miles SSW of Hallo Light. This off-lying danger has a least depth of 10.5m and is marked by a lighted buoy moored about 0.4 mile SSW of it.

Bondebrotten, a group of islets and rocks, lies centered about 1.5 miles SW of the S end of Malmon. Malmobrotten, a group of shoals with rocks awash, lies centered 0.4 mile N of the N end of Bondebrotten.

Dynabrott Light (58°17.8'N., 11°18.5'E.) is shown from a prominent floodlit tower with a helicopter platform, 26m high, standing on the southeasternmost rock of Bondebrotten, 3.7 miles SE of Hallo Light.

Brandskarsflak Light (58°17.6'N., 11°18.7'E.), equipped with a racon, is shown from a prominent floodlit tower with a helicopter platform, 26m high, standing on a shoal, 0.2 mile SSE of Dynabrott Light.

Djupstabaden, a detached shoal bank, lies 1.5 miles WSW of Dynabrott Light. It has a least depth of 5m and forms the outermost danger in this vicinity.

Vastingskaren, a group of islets and rocks, lies centered about 1.5 miles E of Brandskarsflak Light.

Dynabott Light

Brandskarsflak Light

Tan Light (58°17.8'N., 11°19.6'E.) is shown from a floodlit tower, 8m high, standing on the northwesternmost islet of Vastingskaren, 0.6 mile ENE of Brandskarsflak Light.

Tan Light

Lilla Korno lies 1.3 miles ENE of Tan Light. This island has a high light-colored summit.

Svensholmen Light (58°18.7'N., 11°21.9'E.) is shown from a tower, 7m high, standing on an islet lying close N of Lilla Korno.

Svensholmen Light

Karva Light (58°19.5'N., 11°21.7'E.) is shown from a flood-lit tower, 11m high, standing on a reef fringing the S side of Karva Islet, 0.8 mile N of Svensholmen Light.

Karva Light

Brofjordens Angoring Lighted Buoy (58°15'N., 11°13'E.), equipped with a racon, is moored about 3.8 miles SW of Brandskarsflak Light.

Ornefjorden (58°23'N., 11°19'E.) extends about 1.6 miles N and is entered close W of the N end of Malmon.

Abyfjorden (58°23'N., 11°24'E.) extends about 8 miles NNE and is entered close E of the N end of Malmon.

Although anchorage is available in the lower part of Abyfjorden, both this fjord and Ornefjorden are of no commercial significance.

Several harbors and marinas, used only by fishing vessels and pleasure craft, are located in the area of Ornefjorden, Abyfjorden, and Brofjorden. The main harbors include the following:

1. Malmon (58°21.0'N., 11°20.5'E.).
2. Ryxo (58°22'N., 11°27'E.).
3. Lilla Korno (58°18.5'N., 11°22.2'E.).
4. Stora Korno (58°18.3'N., 11°22.8'E.).

5.13 Brofjorden (58°22'N., 11°25'E.) (World Port Index No. 23950) extends about 4 miles NNE and is entered 1.5 miles E of Malmon. Trommekilen branches SE from this fjord about 1.5 miles above the entrance.

Scanraff Oil Refinery, which is served by Brofjorden Oil Harbor, is situated on the S side of the entrance to Trommekilen.

Brofjorden—Scanraff Refinery

Depths—Limitations.—Brofjorden is approached through two channels. The main approach channel leads NE for about 7 miles from close NW of the Brofjordens Angoring Lighted Buoy (58°15'N., 11°13'E.) and passes between Dynabrott Light and Brandskarsflak Light. It continues NE and passes NW of Tan Light, NW of Svensholmen Light, and SE of Karva Light. The fairway has a minimum width of 290m, for a length of about 700m, and is authorized for drafts up to 12m as far as Trommekilen.

A secondary approach channel leads E and passes between the buoys marking the S end of Malmobrotten and the N end of Bondebrotten. The fairway, which is authorized for drafts up to 8m, joins the main channel about 0.7 mile W of Svensholmen Light.

The oil harbor provides five berths. Raoljehamnen, a crude oil berth, is situated on the E side of the fjord, about 1 mile above the entrance. It is 135m long and has a depth of 28m alongside. Tankers up to 500,000 dwt and 25m draft can be accommodated.

Produkthamen, a product terminal jetty, extends 380m ENE from the S shore of Trommekilen and provides four berths. The two outer berths are 80m long and have a depth of 16m alongside. They can accommodate vessels up to 60,000 dwt, 230m in length, and 14.4m draft.

The two inner berths have a depth of 8.8m alongside and can accommodate vessels up to 120m in length and 8m draft.

It is reported that a new jetty berth in the port is operational. It is 54m long and has a depth of 14m alongside. Vessels up to 200m in length, 33m beam, and 11.6m draft can be handled.

Aspect.—Brofjorden Angoring Lighted Buoy and Brandskarsflak Light are equipped with racons. The main approach channel is marked by lighted buoys and indicated by a lighted range. In addition, the outer limits of the fairway are indicated by lighted ranges and light sectors, which may best be seen on the chart.

Conspicuous wind generators stand near the ends of an islet lying 1 mile ENE of Svensholmen Light. Several conspicuous

flares and chimneys stand in the vicinity of the Scanraff Oil Refinery. The two highest chimneys have an elevation of 165m.

Pilotage.—Pilotage to Brofjorden is compulsory for the following vessels (see paragraph 5.1):

1. All Category 1 vessels.
2. Category 2 vessels of 90m length or 16m beam and over.
3. Category 3 vessels of 90m length or 16m beam and over.

Generally, initial ordering of pilots should be carried out via the Swedish Vessel Reporting System (FRS) on the Swedish Maritime Administration internet website (see paragraph 5.1). In exceptional cases, pilots (call: Brofjordens Pilot) may be ordered by telephone or on VHF channel 10. A preliminary request for pilotage should be made at least 24 hours in advance. A definitive pilotage request must be made via the Pilot Request System at least 5 hours in advance.

Pilots may be contacted by VHF and board in the following positions:

1. VLCCs and vessels with obligatory escort towing—about 3 miles SW of Brofjordens Angoring Lighted Buoy.
2. Other vessels—about 1.2 miles WNW of Brofjordens Angoring Lighted Buoy (58°15'N., 11°13'E.) or within the archipelago S of Lysekil.

Generally, two pilots are required for vessels over 60,000 grt, 260m in length, or 40m beam.

VLCCs should send an ETA to the oil terminal 72 hours in advance, with amendments sent 48 hours and 24 hours prior to arrival.

Product tankers should send an ETA to the oil terminal 48 hours in advance, with amendments sent 24 hours prior to arrival.

Regulations.—The approaches to Brofjorden lie within the Lysekil VTS system area (see paragraph 5.15).

All loaded and ballasted crude oil tankers and all loaded product tankers exceeding 20,000 dwt bound for Brofjorden must be escorted by tugs commencing from the waters lying 3 miles S of the Brofjordens Angoring Lighted Buoy.

The berthing of VLCCs is restricted when either the current at the outer lighted buoys exceeds 1 knot, the visibility is under 4 miles, or the wind force exceeds 12m per second.

Anchorage.—An anchorage area, for the use of ULCCs and VLCCs, lies centered 4 miles SSW of Brofjordens Angoring Lighted Buoy. This area has depths 57 to 72m and may best be seen on the chart.

Four anchorages, designated A to D, lie close E of the S part of Malmon (58°20'N., 11°20'E.) and may best be seen on the chart. These anchorages have a depth of 30, clay, with good holding ground.

Large vessels, with local knowledge, can obtain sheltered anchorage, in a depth of 19m, clay, close to the SE side of the channel, 1.3 miles NE of Svensholmen Light. Vessels up to 10,000 dwt can anchor here, but there is limited space and the holding ground is not especially good.

Caution.—Due to the residual danger from buried mines, an area, within which anchoring and fishing are prohibited, lies centered 3.5 miles SSE of Brofjordens Angoring Lighted Buoy and may best be seen on the chart.

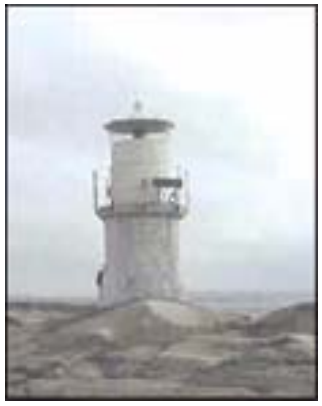
An area, within which special regulations apply to fishing vessels, extends NE from Brofjordens Angoring Lighted Buoy and may best be seen on the chart.

Several submarine cables, which may best be seen on the chart, lie within the approaches and the fjord.

5.14 Gaven Light (58°16'N., 11°21'E.) is shown from a tower, 9m high, standing on an islet lying 1.8 miles SE of Brandskarsflak Light. A beacon is situated on the SW extremity of this islet.

Trillingarna, a group of islets and shallow shoals, fronts the light on its WNW side.

Gaven Light



Gulskaren Light

Gulskaren Light (58°16.8'N., 11°23.5'E.) is shown from a tower, 6m high, standing on the S end of an islet lying 1.4 miles ENE of Gaven Light.

Flatholmen Light (58°15.7'N., 11°24.8'E.) is shown from a structure standing on the NE side of a small island, 2 miles ESE of Gaven Light.

Stangholmen Light (58°16.0'N., 11°24.9'E.) is shown from a structure standing on the E end of an islet lying 0.3 mile N of Flatholmen Light.

Slaggabaden Light (58°15.9'N., 11°26.4'E.) is shown from a floodlit tower, 8m high, standing on a reef at the entrance to the harbor, 0.7 mile E of Stangholmen Light.

Lysekil Redd Light (58°16.1'N., 11°27.2'E.) is shown from

Flatholmen Light

a structure standing on Tova, an above-water rock, lying 0.5 mile ENE of Slaggabaden Light.

Hatten Light (58°10.5'N., 11°22.5'E.) is shown from a tower, 9m high, standing on an islet lying close off the W side of Harmano Island, 5.8 miles SSE of Gaven Light.

Islandsberg Light (58°12.1'N., 11°24.3'E.) is shown from a tower, 7m high, standing on the SW side of Skaftolandet, Island, 1.9 miles NE of Hatten Light.

The waters lying between Gaven Light and Hatten Light, which form the approaches to Lysekil, are encumbered by numerous islands, islets, rocks, and shoals which may best be seen on the chart.

Tovas Ungar, a group of rocks awash, lies about 3.2 miles SW of Gaven Light and is marked close W by a lighted buoy. A wreck, with a least depth of 11m, lies about 0.4 mile WNW of this group.

Vastra Flak, a shoal patch with a least depth of 2m, lies about 0.7 mile SSE of Tovas Ungar at the W side of a group of shallow rocky shoals.

Bonden lies about 3.8 miles SSW of Gavan Light and is high with gently sloping sides. This island may be easily identified by its dark color which contrasts noticeably with the land behind. It is steep-to except on the S side and is surmounted by a prominent beacon, 8m high.

Skramjas Ungar, a shoal patch with rocks awash, lies about 1.6 miles WNW of Hatten Light and is marked by a buoy.

Knappens Flak, a detached shoal with a least depth of 4.2m, lies about 1.1 miles W of Hatten Light and a shoal patch, with depths of 7.5 to 9m, is located 0.5 mile SE of it.

The above island and shoals form the outermost dangers lying in the approaches to Lysekil.

Several small harbors and marinas, used only by fishing vessels, small craft, and pleasure boats, are located in the area of Lysekil. The main harbors include the following:

1. Valbodalen (58°17'N., 11°26'E.)
2. Grundsund (58°13'N., 11°25'E.)
3. Fiskebackskil (58°15'N., 11°28'E.)

5.15 Lysekil (58°16'N., 11°26'E.) (World Port Index No. 23970) is situated on the SW end of a promontory which is located on the NW side of the entrance to Gullmarn.

Gullmarn, also known as Gullmarnsfjorden, extends 10 miles NE from Lysekil, but is of little commercial significance.

Groto, a small peninsula, extends S from the E end of the town and the main commercial quays are located within a basin at its NW side.

Lysekil

Winds—Weather.—Winds from W and SW predominate. Fog is frequent in winter, but it is rare during the summer.

Ice.—Ice forms in the approach channels but usually does not hinder navigation at any time of the year.

Tides—Currents.—The tidal range is generally less than 0.5m; however, the water level may be affected considerably by wind variations. It rises with W winds and falls with E winds.

Generally, a weak current sets N in the approaches. However, under certain wind conditions, the current may become much stronger.

Depths—Limitations.—The main approach route from seaward is authorized for drafts up to 10m

The main quays in the harbor basin include Gullmarskajen, at the N side, which is 180m long and has depths of 9.2 to 9.5m alongside, and Grotokajen, at the S side, which is 160m long and has a depth of 7m alongside.

Anderssonskaj, located at the W side of the harbor, is a passenger quay. It 140m long and has a depth of 5.5m alongside.

Grotorevkajen, located at the SE end of the peninsula, is a container quay. It is 170m long and has a depth of 11.5m alongside.

Fiskhamnen, the main quay in the fishing harbor, is 110m long and has a depth of 4.5m alongside.

There are facilities for general cargo, bulk, passenger ferry, container, and fishing vessels. There is also an extensive marina. Vessels up to 50,000 dwt and 9 m draft can be accommodated.

Aspect.—A church, situated in the SE part of the town, has a spire, 90m high, which is prominent from seaward.

Vallbodalsros, 58m high, rises about 0.5 mile N of the town and is prominent. This light-colored hill slopes gradually on the N and S sides and its summit is surmounted by a cairn and a mast.

Pilotage.—Pilotage to Lysekil is compulsory for the following vessels (see paragraph 5.1):

1. Brofjordens Angoring to Lysekil and Marstrand to Lysekil (via Kyrkesund):
   a. All Category 1 vessels.
   b. Category 2 vessels of 80m length or 15m beam and over.
   c. Category 3 vessels of 90m length or 16m beam and over.

2. Uddevalla to Lysekil:
   a. All Category 1 vessels.
   b. Category 2 vessels of 70m length, 14m beam, and 4.5m draft and over.
   c. Category 3 vessels of 70m length, 14m beam, and 4.5m draft and over.

Generally, initial ordering of pilots should be carried out via the Swedish Vessel Reporting System (FRS) on the Swedish Maritime Administration internet website (see paragraph 5.1). In exceptional cases, pilots (call: Lysekil Pilot) may be ordered by telephone or on VHF channel 10. A preliminary request for pilotage should be made at least 24 hours in advance. A definitive pilotage request must be made via the Pilot Request System at least 5 hours in advance.

Pilots may be contacted by VHF and board in the following positions:

1. VLCCs and vessels with obligatory escort towing—about 3 miles SW of Brofjordens Angoring Lighted Buoy.
2. Other vessels—about 1.2 miles WNW of Brofjordens Angoring Lighted Buoy (58°15'N., 11°13'E.) or within the archipelago S of Lysekil.

The Lysekil station provides pilots for Brofjorden.

Regulations.—A Vessel Traffic Service (VTS) system operates in the approaches to the coast in the vicinity of Lysekil. The VTS area limits are indicated by a line joining the following positions:

1. The mainland (58°07.5'N., 11°25.3'E.).
2. Maseskar Light (58°05.7'N., 11°19.8'E.).
3. Position 58°12.2'N, 11°15.3'E.
4. An arc, with a radius of 3 miles centered on Brofjordens Angoring Lighted Buoy, to position 58°17.3'N, 11°11.4'E.
5. Sejebaden Lighted Buoy (58°21.0'N., 11°09.3'E.).
6. Vajern (58°23.0'N., 11°15.7'E.).
7. The area includes Koljofjord (58°14.0'N., 11°35.0'E.) to the W of 11°45.0E.

The VTS system is mandatory for all vessels of 45m in length and over, all vessels of 300 grt and over, and all tows over 45m in length.

All participating vessels should report to the VTS Control on VHF channel 11, as follows:

1. 30 minutes prior to entering the VTS area (voluntary for vessels equipped with AIS). Vessels must state their name, call sign, position, and destination.
2. On entering the VTS area or immediately prior to leaving a quay or anchorage. Vessels must state their name, call sign, position, intended route, destination, and draft.
3. When passing the Reporting Points, on arrival at a quay, when changing route, when anchoring, on the occurrence of any defects which may affect the safety of navigation, or on leaving the area. Vessels must state their name, position, and destination.

The Reporting Points are, as follows:

1. No. 7—Havstensfjord (58°18.4'N., 11°45.0'E.).
2. No. 8—Koljofjord (58°13.9'N., 11°34.6'E.).
3. No. 9—Islandsberg (58°11.7'N., 11°24.0'E.).

The Lysekil VTS Control provides information on traffic in the area and other navigational details, including ice conditions and passage limitations. The VTS Control, which is operated from Goteborg, can be contacted by e-mail, as follows:

westcoastvts@sjofartsverket.se

All vessels within the VTS area must maintain a continuous listening watch on VHF channels 11 and 16.

Vessels in excess of 20 grt, 15m or more in length, and smaller registered fishing vessels should report if their voyage or activity may influence the safe maneuvering of other vessels.

Vessels must also report to the Malo-Strommar ferry, on VHF channel 11, 30 minutes before their anticipated passage or, at the latest, on reaching Reporting Point No. 9 (inbound) or No. 8 (outbound). When the ferry is moored at the Malo side, the maximum depth over the cable is 5m or less.

Vessels with drafts over 3m and equipped with VHF must report to the Bohus-Malmon ferry on VHF channel 6 before passing the W point of Bjornholmen (58°21.7'N., 11°19.8'E.) (eastbound) and the N point of Store Holme (58°21.3'N., 11°21.3'E.) (westbound). Vessels should maintain a leeway of 200m from the ferry.

The port of Lysekil can be contacted by e-mail, as follows:

olle.samuelson@lysekil.se

Anchorage.—Temporary anchorage, sheltered from W and SW winds, can be taken, in depths of 13 to 20m, sand and mud, about 0.3 mile ENE of the beacon on Bonden.

Vessels can anchor in the vicinity of the harbor, in depths of 25 to 30m, close E of the container quay or close S of Lysekil Redd Light.

Directions.—The main approach route from seaward leads ENE for about 4 miles, using the white sector of Gaven Light, from a position located about 0.5 mile SE of Brofjordens Angoring Lighted Buoy. The route then passes close SSE of Gaven Light and, using the white sector of Gulskaren Light, leads in a NE direction for about 1 mile. When about 0.4 mile distant from Gulskaren Light, the route leads in a SE direction for about 0.8 mile, using the white sector of Flatholmen Light. It continues in a SE direction through the off-lying dangers and passes SW of Stangholmen Light. The route then leads E toward the harbor and passes S of Slaggabaden Light. It continues N into the harbor and passes between Slaggabaden Light and Lysekil Redd Light.

A secondary approach route from seaward leads NE for about 5.5 miles from a position located 0.5 mile NW of Bondon. This route, which is authorized for drafts up to 8m, joins the main route about 0.4 mile SSW of Gavan Light.

An alternate approach route, which is authorized for drafts up to 8m, leads in an E direction for 4 miles from a position located 1.4 miles WSW of Gaven Light. This route can only be used during calm weather and good visibility.

Another secondary approach route, which is authorized for drafts up to 8m, leads in a NNE direction from close SW of Hatten Light. This route, which passes close WNW of Islandsberg Light, leads between the W side of Skaftolandet and the off-lying dangers. It should not be used during strong W winds. This route may also be entered from WNW by passing 0.8 mile

SSW of Bondon. The track leads ESE, using the white sector of Hatten Light, and then turns NNE.

Caution.—A degausing range, consisting of seven dolphins, is situated close S of the S side of Groto peninsula.

Several submarine cables and pipelines, best be seen on the chart, lie in the approaches and in the vicinity of the harbor.

A ferry runs between the harbor and Fiskebackskill, 1.5 miles SSE.

Due to the residual danger from buried mines, restricted areas, within which anchoring and fishing are prohibited, lie close S of Flatholmen and between Lysekil Redd Light and the S side of Groto. For additional information regarding similar restricted areas in the approaches, see paragraph 5.13.

A wave-power farm has been established in an area centered about 1.4 miles NNW of Hatten Light (58°10.5'N., 11°22.5'E.).

Approaches to Uddevalla

5.16 The principal seaward approaches to Uddevalla are from the S and extend between Maseskar Light and Hatteberget Light, 14.5 miles SSE. The approaches are encumbered by numerous islands, islets, rocks, and shoals which may best be seen on the chart. The two largest islands are Orust (58°10'N., 11°40'E.) and Tjorn (58°00'N., 11°40'E.), close S. The main approach is known as South Channel and is described in paragraph 5.17 (under Directions—South Channel).

Vessels may also approach Uddevalla via North Channel. This approach route is described in paragraph 5.17 (under Directions—North Channel); however, it is only authorized for vessels with a maximum draft of 4m and a maximum length of 70m.

Several other smaller channels, which lie between Orust and Tjorn, are described in paragraph 5.17 (under Directions—Other Channels).

Tides—Currents.—The water level in the seaward approaches to Uddevalla may be affected by the wind. The level rises during winds from W and falls during winds from E. The changes in the water level range from 1.5m above mean sea level to 1.1m below it. Generally, the fall at LW does not decrease the mean water level by more than 0.7m.

Pilotage.—Pilotage to Uddevalla is compulsory for the following vessels (see paragraph 5.1):

1. Hatteberget to Uddevalla:
   a. All Category 1 vessels.
   b. Category 2 vessels of 80m length or 15m beam and over.
   c. Category 3 vessels of 90m length or 16m beam and over.
2. Brofjordens Angoring Lighted Buoy and Lysekil (via Malo-Strommar) to Uddevalla:
   a. All Category 1 vessels.
   b. Category 2 vessels of 70m length, 14m beam, and 4.5m draft and over.
   c. Category 3 vessels of 70m length, 14m beam, and 4.5m draft and over.

Generally, initial ordering of pilots should be carried out via the Swedish Vessel Reporting System (FRS) on the Swedish Maritime Administration internet website (see paragraph 5.1). In exceptional cases, pilots (call: Marstrand Pilot) may be ordered by telephone or on VHF channel 10. A preliminary request for pilotage should be made at least 24 hours in advance. A definitive pilotage request must be made via the Pilot Request System at least 5 hours in advance.

Pilots may be contacted by VHF and board in the following positions:

1. About 1.2 miles WNW of Brofjordens Angoring Lighted Buoy.
2. Near Hatteberget Light (57°52'N., 11°28'E.).

Regulations.—The approaches to Uddevalla lie within the Marstrand VTS system area (see paragraph 5.20).

5.17 **Maseskar Light** (58°06'N., 11°20'E.) is shown from a prominent tower, 13m high, standing on an islet of the same name lying 5 miles SSW of Hatten Light. A conspicuous disused framework light tower, 22m high, is situated close NE of the light.

Masekar Light (background) and Disused Light Tower

Maseskar lies near the S end of a chain of islets and rocky shoals which extends about 5 miles S from the S side of Harmano. Svarten, an islet, lies on a shoal bank about 0.6 mile SSE of Maseskar Light and is marked by a beacon.

Makrillebaden (58°03'N., 11°20'E.), with a least depth of 12m, lies 2.3 miles S of Maseskar Light. This shoal bank is located at the S end of the dangers extending from Harmano and vessels should keep well clear of it during heavy weather.

Kraksundsgap Sodra Light (58°06.0'N., 11°26.4'E.) is shown from a prominent tower, 13m high, standing on the NW extremity of an islet lying 3.5 miles ENE of Maseskar Light.

Hatteberget Light (57°52'N., 11°28'E.), equipped with a racon, is shown from a prominent tower surmounted by a helicopter platform, 26m high, standing on a rocky shoal lying 14.5 miles SSE of Maseskar Light.

An isolated shoal, with a least depth of 12m, lies close SE of the light and is marked by a lighted buoy.

Storebaden lies centered 0.7 mile NNW of Hatteberget Light and has a least depth of 8.5m. This detached shoal bank is marked by a lighted buoy, moored close SW, and a buoy, mooed close NNW.

Krakebaden lies centered 1.1 miles ESE of Hatteberget Light. This detached shoal bank has a least depth of 3.3m and is marked by a lighted buoy moored close NNW.

Hamneskar Light (57°54'N., 11°28'E.) is shown from a lat-

Hatteberget Light

tice mast, 9m high, standing on an islet lying near the SW end of Pater Noster Skaren, 2 miles NNE of Hatteberget Light. The disused framework light tower of Pater Noster also stands on this islet and is prominent from seaward.

Hamneskar Light

Pater Noster Disused Light Tower

Pater Noster Skaren (58°03'N., 11°20'E.) is an extensive chain of low-lying islets, rocks, and shoals extending about 5 miles SW from the S end of Tjorn.

Dynan, an above-water rock, lies about 1 mile W of Hamneskar Light and is the outermost danger at the SW end of Pater Noster Skaren.

Eggskar Light (57°56.8'N., 11°31.1'E.) is shown from a tower, 7m high, on the E extremity of an islet lying at the NE side of Pater Noster Skaren, 3.3 miles NNE of Hamneskar Light; a prominent beacon stands on the N side of the islet.

Eggskar Light and Beacon

Skallen Light (57°53.4'N., 11°33.5'E.) is shown from a tower, 6m high, standing on the NW extremity of Marstrandson, 3.6 miles ENE of Hatteberget Light.

Skallen Light

Astol Light (57°55.3'N., 11°35.1'E.) is shown from a floodlit tower standing on the S side of an islet lying 2 miles NNE of Skallen Light.

Boxvike Kile (58°07'N., 11°30'E.), 117m high, is the tallest hill in the SW part of Orust. It rises 5.5 miles ENE of Maseskar Light and is prominent from seaward. A hill with three peaks stands about 0.5 mile SE of Boxvike Kile.

Stigberget (58°04'N., 11°33'E.), 88m high, rises at the NW end of Tjorn, 7.5 miles ESE of Maseskar Light. This hill slopes gradually on all sides and is prominent from seaward.

Traneros rises 0.4 mile S of Stigberget. This hill is 97m high and much steeper.

Sankt Olofs Valar (58°01'N., 11°31'E.), a dark-colored hill, rises 3 miles SSW of Stigberget and is prominent from seaward. It is surmounted by four hummocks of which only three can usually be identified. Three beacons are situated on

the summit and a conspicuous radio mast, 75m high, stands close S of them.

Vetteberget (57°58'N., 11°37'E.), 116m high, slopes gradually on its S side and is prominent from seaward. This hill stands in the S part of Tjorn 2.4 miles NNE of Astol Light.

Tjorne Huvud (57°56'N., 11°35'E.) rises on the S end of Tjorn 0.8 mile N of Astol Light. This prominent hill has a conical peak and is quite steep on all sides. It is reported to be more easily distinguishable than Vetteberget.

A conspicuous radio mast, 75m high, stands at an elevation of 130m about 0.7 mile NNW of Tjorne Huvud.

Bratton (57°55'N., 11°44'E.), 131m high, is the summit of an islet lying 5 miles E of Astol Light. This conspicuous hill has a bluish color when seen from a distance to seaward.

Directions—South Channel.—The main South Channel to Uddevalla can be divided into two parts. The S part lies between Tjorn and the mainland to the E; while the N part lies between the E side of Orust and the mainland.

The route in the S part leads in a NE direction from the vicinity of Hatteberget Light (57°52'N., 11°28'E.). It initially leads NE for about 5 miles through Marstrandsfjorden (57°53'N., 11°31'E.) and continues E for 2.5 miles through Algofjorden (57°55'N., 11°40'E.). The route then leads NE and NNE for 10 miles through Hakefjorden (57°58'N., 11°44'E.) and Askerofjorden (58°04'N., 11°47'E.) to a position located off Stenungsund (58°05'N., 11°49'E.).

From seaward three entrance tracks, which may best be seen on the chart, lead into the S end of South Channel, as follows:

1. The northernmost track leads in an ENE direction toward Skallen Light (57°53.4'N., 11°33.5'E.) from a position located 1.9 miles NW of Hatteberget Light. It passes NNW of Storebaden and joins the central track at a position located about 2 miles NE of Hatteberget Light.
2. The central track leads NE in the white sector of Astol Light (57°55.3'N., 11°35.1'E.). It passes between Hatteberget Light and Storebaden.
3. The southernmost track leads in a NE direction and passes between Hatteberget Light and Krakebaden. It joins the central track at a position located about 2 miles NE of Hatteberget Light.

The route through the S part of South Channel is authorized for drafts up to 15m as far as Algofjorden and up to 13.5m as far as Askerofjorden (Stenungsund).

The fairway is spanned by the Tjornbron Suspension Bridge (58°03.5'N., 11°46.9'E.), WSW of Stenungsund, which has a vertical clearance of 43m over a passage width of 110m.

The route in the N part of the South Channel leads in a N direction for about 14 miles from the vicinity of Stenungsund through Halsefjorden (58°07'N., 11°48'E.), Svanesund (58°08'N., 11°50'E.) and Bjorningarna (58°16'N., 11°50'E.) to the S side of Havstensfjord (58°19'N., 11°47'E.). The route then continues ENE for about 4 miles through Vrangelyckan (58°19'N., 11°49'E.) and Sunningesund, close E, to Uddevalla.

The route in the N part of the South Channel, from Askerofjorden to the entrance to Uddevalla, is authorized for drafts up to 11m.

An overhead cable spans the fairway at Grotaholme (58°09.5'N., 11°51.5'E.) and has a vertical clearance of 58m.

The Uddevallabron Bridge spans the fairway at Sunningesund and has a vertical clearance of 47m.

Directions—North Channel.—The main North Channel to Uddevalla leads in a NE direction between the mainland and the NW side of Orust. It passes through a series of fjords which, in order from SE to NW, are Koljofjord (58°14'N., 11°35'E.), Borgilefjorden (58°15'N., 11°38'E.), Kalvofjord (58°17'N., 11°40'E.), and Notesund (58°18'N., 11°42'E.).

From the NE end of Notesund, the channel leads into the W side of Havstensfjord (58°19'N., 11°45'E.) and joins the N end of the South Channel.

A fixed bridge, with a central passage 102m wide, spans Notesund. It has a vertical clearance of 25m over a navigable width of 50m.

North Channel can be entered from the vicinity of Lysekil (see paragraph 5.15). This secondary route leads S for 1.5 miles, passing between the NE side of Skaftolandet and the mainland. It then continues ESE for 2 miles and enters the NW side of Koljofjord. The route passes NNE of Bassholmen (58°14.5'N., 11°30.0'E.) and through Stommarna, which lies between the mainland and Flaton. The fairway is intricate and only authorized for drafts up to 3.3m. It passes under a bridge with a vertical clearance of 16.8m.

The main entrance route to North Channel leads in a NNE direction from close SW of Hatten Light (58°10.5'N., 11°22.5'E.). After passing close WNW of this light, the route continues for 1.3 miles, using the white sector of Islandsberg Light. It then leads ESE into Ellosefjorden (58°11'N., 11°27'E.), passing between the S end of Skaftolandet and the N end of Harmano.

This route may also be entered from WNW by passing 0.8 mile SSW of Bondon (58°12.6'N., 11°19.0'E.). The track leads ESE, using the white sector of Hatten Light, and then turns NNE.

From Ellosefjorden, the entrance route leads in a NE direction through Malo Strommar (58°11.8'N., 11°29.4'E.) and Bjornsundskanalen (58°12.5'N., 11°30.5'E.) into the SW end of Koljofjord.

The North Channel to Uddevalla is authorized for drafts up to 5m and has a least bottom width of 40m. The entrance route as far as Ellosefjorden is authorized for drafts up to 7.5m.

Due to a bottom width of only 40m in the turns, it is reported that vessels are limited to a length of about 70m. Vessels with drafts or lengths above these limits are advised to use the South Channel.

Directions—Other Channels.—A sheltered inner passage route leads in a S direction through the approaches from the vicinity of Islandsberg Light (58°12'N., 11°24'E.) to Marstrand (55°53'N., 11°35'E.). This route is authorized for drafts up to 4m and is used only by local ferries, coasters, small craft, fishing vessels, and pleasure boats. The channel is narrow in places and requires local knowledge.

A secondary approach route to Uddevalla leads from W between the S side of Orust and the N side of Tjorn. It passes through Krakeford (58°03'N., 11°30'E.), Hastesskarsfjorden (58°03.5'N., 11°31.5'E.), Stigfjorden (58°04'N., 11°35'E.), Skapesund (58°05.6'N., 11°42.3'E.), and Askerofjoeden (58°04'N., 11°47'E.). This route is spanned by an overhead cable, with a vertical clearance of 29m, and the Skapesund Bridge, with a vertical clearance of 21m. It is authorized for drafts up to 3.2m and is only used by small craft, fishing vessels, and pleasure boats, with local knowledge.

Caution.—Several submarine cables and pipelines lie across the approach routes and may best be seen on the chart.

A line-driven ferry crosses Malo Strommar (North Channel) near Hallen (58°11.7'N., 11°29.5'E.). Vessels must report to the ferry 30 minutes before their passage on VHF channel 11.

On autumn and winter night, the high shores of some of the fjords often cast heavy and misleading shadows. Local banks of mist can also be encountered along the routes.

The tidal currents within the narrows at Malo Stromma and Bjornsundskanalen (North Channel) may attain rates up to 3.5 knots.

The tidal current setting S within the narrows at Svanesund (58°08'N., 11°50'E.) may attain a rate up to 3.5 knots.

A vehicle ferry crosses Svanesund (South Channel) but is obliged to give way to vessels transiting the sound.

In the vicinity of the Tjornbron Suspension Bridge, the view of the channel ahead is obstructed and vessels may be met with little warning.

Due to residual danger from mines buried on the bottom, vessels are cautioned not to carry out any seabed activities in an area, with a radius of 0.5 mile, centered on position 57°57'N, 11°11'E; in an area, with a radius of 0.5 mile, centered on position 57°57'N, 11°18'E; and in a large area centered 5 miles S of Hatteberget Light, which may best be seen on the chart.

5.18 Several small harbors and marinas are situated among the islands and islets lying in the approaches to Uddevalla. They are used only by local ferries, small coasters, fishing vessels, small craft, and pleasure boats. The main harbors include the following:

1. Karingon (58°07'N., 11°22'E.).
2. Kladesholmen (57°57'N., 11°32'E.).
3. Mossholmen (5°57.1'N., 11°33.6'E.).
4. Ronnang (57°56.5'N., 11°34.7'E.).
5. Hallevikssstrand (58°07.4'N., 11°26.7'E.).
6. Edshultshall (58°06.5'N., 11°28.0'E.).
7. Mollosund (58°04'N., 11°28'E.).
8. Bjorholmen (58°03.0'N., 11°31.4'E.).
9. Angevikens (58°02.0'N., 11°30.4'E.).
10. Astol (57°55.5'N., 11°35.3'E.).
11. Stora Dyron (57°56'N., 11°37'E.).
12. Nordon (57°53.5'N., 11°41.4'E.).
13. Almosund (58°04'N., 11°46'E.).

5.19 **Ellos** (58°11'N., 11°28'E.), a small industrial harbor and marina, is situated at the SE side of Ellosefjorden. It can be approached from NE via the North Channel, which is authorized for drafts up to 5m. The harbor can also be approached via the route leading from the vicinity of Hatten Light (see paragraph 5.14), which is authorized for drafts up to 7.5m.

The main berth is Traverskajen, which is 80m long and has depths of 5 to 6.5m alongside. Vessels may anchor, in depths of 16 to 18m, clay, about 0.4 mile W of the harbor.

Skarhamn (57°59'N., 11°33'E.), a small oil terminal and fishing harbor, is situated at the W side of Tjorn. An approach channel, indicated by a lighted range, leads from seaward in a NE direction for 2.5 miles through the off-lying dangers to the harbor.

The oil basin provides four berths; the main berth is 135m long and has a depth of 6.2m alongside. The fishing basin provides five berths; the main berth is 130m long and has a depth of 4.5m alongside.

Angholmen (57°57'N., 11°34'E.), a small harbor, is situated at the NE side of a peninsula and serves a fishmeal factory. An approach channel, authorized for drafts up to 6m, leads from SW through the off-lying dangers. Local knowledge is required.

The harbor provides four main berths. The deepest berth is 55m long and has a depth of 5.5m alongside. The largest berth is 130m long and has depths of 3 to 5.5m alongside. Anchorage can be taken, in depths of 16 to 18m, clay, about 0.3 mile W of the harbor.

5.20 **Marstrand** (57°53'N., 11°37'E.) (World Port Index No. 24010), a commercial port and fishing harbor, is situated on the SE side of Marstrandsfjorden, 4.5 miles ENE of Hatteberget Light. The harbor is contained between the SW part of Koon Island, the N part of Klaveron Island, and the E part of Marstrandson Island. Entrance channels lead N and S of Marstrandson. A main pilot station is situated at the harbor.

Ice.—The harbor only freezes during severe winters. Generally, the N entrance channel remains ice-free for longer than the S channel.

Depths—Limitations.—A secondary entrance channel leads N of Marstrandson and is authorized for drafts up to 4m.

The main entrance channel leads S of Marstrandson and is authorized for drafts up to 7m as far as the anchorage.

The commercial facilities are situated at the E side of Marstrandson. The main berth is 150m long and has depths of 3 to 4m alongside.

A disused shipyard is situated within the harbor. It has a main berth, 153m long, with depths of 4.1 to 4.8m alongside. There are also extensive facilities for small craft, fishing vessels, and pleasure boats.

Aspect.—A conspicuous fort, with a round tower, stands on the E part of Marstrandon.

Marstradon Fort

Pilotage.—Pilotage to Marstrand is compulsory for the following vessels (see paragraph 5.1):

1. Brofjordens Angoring Lighted Buoy to Marstrand, Marstrand to Lysekil (via Kyrkesund), and Hatteberget to Marstrand:
   a. All Category 1 vessels.

b. Category 2 vessels of 80m length or 15m beam and over.

c. Category 3 vessels of 90m length or 16m beam and over.

2. Marstrand to Goteborg and Trubaduren (via Skargarden):

a. All Category 1 vessels.

b. Category 2 vessels of 70m length, 14m beam, and 4.5m draft and over.

c. Category 3 vessels of 70m length, 14m beam, and 4.5m draft and over.

Generally, initial ordering of pilots should be carried out via the Swedish Vessel Reporting System (FRS) on the Swedish Maritime Administration internet website (see paragraph 5.1). In exceptional cases, pilots (call: Marstrand Pilot) may be ordered by telephone or on VHF channel 10. A preliminary request for pilotage should be made at least 24 hours in advance. A definitive pilotage request must be made via the Pilot Request System at least 5 hours in advance.

Pilots may be contacted by VHF and board near Hatteberget Light (57°52'N., 11°28'E).

The station provides pilots for Marstrand, Stenungsund, Uddevalla, Wallhamn.

Regulations.—A Vessel Traffic Service (VTS) system operates in the approaches to the coast in the vicinity of Marstrand. The VTS area limits are indicated by a line joining the following positions:

1. The existing VTS Goteborg limit near Torrbeskar (57°44.1'N., 11°35.0'E.).
2. Stora Poisan Light (57°46.5'N., 11°31.3'E.).
3. Position 57°49.0'N, 11°29.5'E.
4. An arc, with a radius of 3 miles centered on Hatteberget Light to position 57°54.6'N, 11°25.5'E.
5. Masekar Light (58°05.6'N., 11°19.8'E.).
6. The mainland (58°07.5'N., 11°25.3'E.).
7. The area includes Askerofjorden (58°05'N., 11°47'E.) and Havstenfjord (58°18'N., 11°47'E.) to the E of 11°45.0E.

The VTS system is mandatory for all vessels of 45m in length and over, all vessels of 300 grt and over, and all tows over 45m in length.

All participating vessels should report to the VTS Control on VHF channel 11, as follows:

1. 30 minutes prior to entering the VTS area (voluntary for vessels equipped with AIS). Vessels must state their name, call sign, position, and destination.
2. On entering the VTS area or immediately prior to leaving a quay or anchorage. Vessels must state their name, call sign, position, intended route, destination, and draft.
3. When passing the Reporting Points, on arrival at a quay, when changing route, when anchoring, on the occurrence of any defects which may affect the safety of navigation, or on leaving the area. Vessels must state their name, position, and destination.

The Reporting Points are, as follows:

1. No. 2—Mitholmarna (57°58.0'N., 11°43.3'E.).
2. No. 3—Halsefjord (58°06.9'N., 11°49.0'E.).
3. No. 4—Strandanas (58°12.4'N., 11°51.2'E.).
4. No. 7—Havstensfjord (58°18.4'N., 11°45.0'E.).

The Marstrand VTS Control provides information on traffic in the area and other navigational details, including ice conditions and passage limitations. The VTS Control can be contacted by e-mail, as follows:

westcoastvts@sjofartsverket.se

All vessels within the VTS area must maintain a continuous listening watch on VHF channels 11 and 16.

Anchorage.—Anchorage is available, in depths of 10 to 12m, clay, close E of the SE extremity of Marstrandson.

Caution.—A line-driven ferry operates in the harbor between Koon Island and Marstrandson.

Several submarine cables and pipelines are situated within the harbor and may best be seen on the chart.

At times, numerous pleasure craft and sail boats may be encountered in the approaches to Marstrand.

5.21 Wallhamn (58°01'N., 11°42'E.) (World Port Index No. 24009), a small commercial port, is located on the SE side of Tjorn. It lies at the head of Svanvikskile, an inlet, which extends 2.5 mile N from Hakefjord in the S part of the South Channel. The harbor has extensive facilities for the shipping of automobiles.

Depths—Limitations.—The entrance channel, about 100m wide, leads N to the harbor and, along with the harbor basin, has a dredged depth of 11m. It is authorized for drafts up to 10m.

The main quays are located along the N side of the basin. There is a turning area in the S part of the basin which has a diameter of 250m and a depth of 10.8m.

Berth No. 2, 80m long, and Berth No. 3, 130m long, have depths of 10.8m alongside. Berth No. 4, 160m long, and Berth No. 5, 239m long, have depths of 8.5m alongside. All these berths are equipped with a ro-ro ramp. Berth No. 6, 55m long, has a depth of 5.5m alongside and is used for exporting stone.

The harbor has facilities for general cargo, bulk, container, ro-ro, and vehicle carrier vessels. Vessels up to 230m in length and 10m draft can be accommodated.

Aspect.—The entrance channel is marked by buoys and its limits are indicated by lighted ranges.

Pilotage.—Pilotage to Wallhamn is compulsory for the following vessels (see paragraph 5.1):

1. All Category 1 vessels.
2. Category 2 vessels of 80m length or 15m beam and over.
3. Category 3 vessels of 90m length or 16m beam and over.

Generally, initial ordering of pilots should be carried out via the Swedish Vessel Reporting System (FRS) on the Swedish Maritime Administration internet website (see paragraph 5.1). In exceptional cases, pilots (call: Marstrand Pilot) may be ordered by telephone or on VHF channel 10. A preliminary request for pilotage should be made at least 24 hours in advance. A definitive pilotage request must be made via the Pilot Request System at least 5 hours in advance.

Pilots may be contacted by VHF and board near Hatteberget Light (57°52'N., 11°28'E.).

Regulations.—The approaches to the harbor lie within the Marstarnd VTS system area (see paragraph 5.20).

The port of Wallhamn can be contacted by e-mail, as follows:

info@wallhamn.se

5.22 Stenungsund (58°04'N., 11°50'E.) (World Port Index No. 24000), fronted by the island of Stenungson, is a small industrial port located at the E side of Askerofjorden.

Depths—Limitations.—Talludden Terminal is located at the NE side of Stenungsundet, the channel lying between the E side of Stenungson and the mainland. It can be approached from N or S. The quay, which is used for loading stone, is 100m long and has a depth of 6m alongside. The S part of Stenungsundet is spanned by a bridge, which has a vertical clearance of 13m over a navigable width of 30m. Generally, vessels up to 100m in length, 14m beam, and 5m draft can be handled.

Hydrokajen (Hydro Plast Terminal) is located at the mainland side of the N end of Stenungsundet. It is approached through a channel with a dredged depth of 9.5m over a navigable width of 50m. The berth, which consists of a quay with a dolphin extension, is 100m long and has depths of 8.8 to 9.5m alongside. It is used for loading salt and chemicals. Generally, vessels up to 175m in length, 25m beam, and 9m draft can be handled.

Havdens Oljepir (Borealis Terminal) is located on the mainland about 0.4 mile NNE of the N entrance to Stenungsundet. It is used to discharge oil and gaseous products. The quay is 60m long and has a depth of 14m alongside. Berthing dolphins are situated 35m from each end. Generally, vessels up to 65,000 dwt, 240m in length, and 13.5m draft can be handled.

Kraftverkshamnen (Power Plant Terminal) is located on the mainland about 0.7 mile NE of the N entrance to Stenungsundet. It handles oil and gaseous products. A jetty, 110m long, extends from the shore and has depths of 12m and 10.5m alongside its N and S sides, respectively. Generally, vessels up to 60,000 dwt, 250m in length, 50m beam, and 11.5m draft can be handled.

Aspect.—The approach channels leading to the berths are indicated by lighted ranges.

Pilotage.—Pilotage to Stenungsund is compulsory for the following vessels (see paragraph 5.1):

1. All Category 1 vessels.
2. Category 2 vessels of 80m length or 15m beam and over.
3. Category 3 vessels of 90m length or 16m beam and over.

Generally, initial ordering of pilots should be carried out via the Swedish Vessel Reporting System (FRS) on the Swedish Maritime Administration internet website:

Swedish Maritime Administration Home Page
http://www.sjofartsverket.se

In exceptional cases, pilots (call sign: Marstrand Pilot) may be ordered by telephone or on VHF channel 10. A preliminary request for pilotage should be made at least 24 hours in advance. A definitive pilotage request must be made via the Pilot Request System at least 5 hours in advance.

Pilots may be contacted by VHF and board near Hatteberget Light (57°52'N., 11°28'E.).

Regulations.—The approaches to the harbor lie within the Marstarnd VTS system area (see paragraph 5.20).

The port of Stenungsund can be contacted by e-mail, as follows:

kontoret@hamntjanst.se

All tankers and gas tankers over 20,000 dwt, loaded or in ballast, must be escorted by a tug when proceeding between Skallen Light and any quay or the inner anchorage.

Anchorage.—Anchorage is available, in a depth of 12m, clay, good holding ground, at the W side of the main route about 0.6 mile NNW of the Tjornbron Suspension Bridge.

5.23 Uddevalla (58°21'N., 11°55'E.) (World Port Index No. 23990) is situated on the NE side of Byfjorden at the mouth of the Bavean River. It lies about 40 miles from the sea and serves an industrial area. The port can be approached via the North Channel or the South Channel, both of which are described in paragraph 5.17.

The harbor consists of several river berths and a deep-water commercial basin, which contains an oil complex.

Uddevalla from E

Winds—Weather.—The prevailing winds are from the W. Fog is frequent in winter. The least amount of fog usually occurs in June and July but patches of fog may be found in the fjords at any time.

Ice.—Ice seldom obstructs the harbor. During severe winters, the port is kept open by icebreakers.

Tides—Currents.—The mean tidal range is 0.6m, but the water level in the approaches may be affected by the wind.

The current always sets outward from the harbor and, at times, may attain a rate of 3 knots in the narrow parts of the channel.

Depths—Limitations.—Kasebukten, the main basin, indents the N side of the head of Byfjorden. Bado, a small basin, is located close to the N side of the river mouth. Skeppsholmen, a pier, extends SW from the E side of Kasebuken and separates this basin from the NW side of Bado.

The port provides 18 main berths. The principal berths include Badokajen, which is 430m long and has depths of 6 to 9.5m alongside; Bave, which is 180m long and has a depth of 7m alongside; and Skeppsholmenspiren, which is 340m long and has depths of 10.3 to 11m alongside.

Sorvik, an oil terminal quay, is situated at the W side of Kasebukten. It is 250m long and has a depth of 10.6m alongside. A disused shipyard is situated at the SW side of Kasebukten and is fronted by a quay with a depth of 10.3m alongside.

A quay extends along the N side of Kasebukten and has a depth of 6m alongside. A jetty projects 260m S from this quay and has a depth of 7m alongside each of its sides.

Froland, a bulk ore quay, is situated on the NW side of Byfjorden about 1 mile WSW of Kasebukten. It is 225m long and has a depth of 12m alongside.

The port has facilities for general cargo, container, tanker, ro-ro, bulk, and timber vessels. There are also facilities for small craft and pleasure boats. Vessels up to 30,000 dwt and 10.3m draft can be accommodated in the port. They must approach through the South Channel.

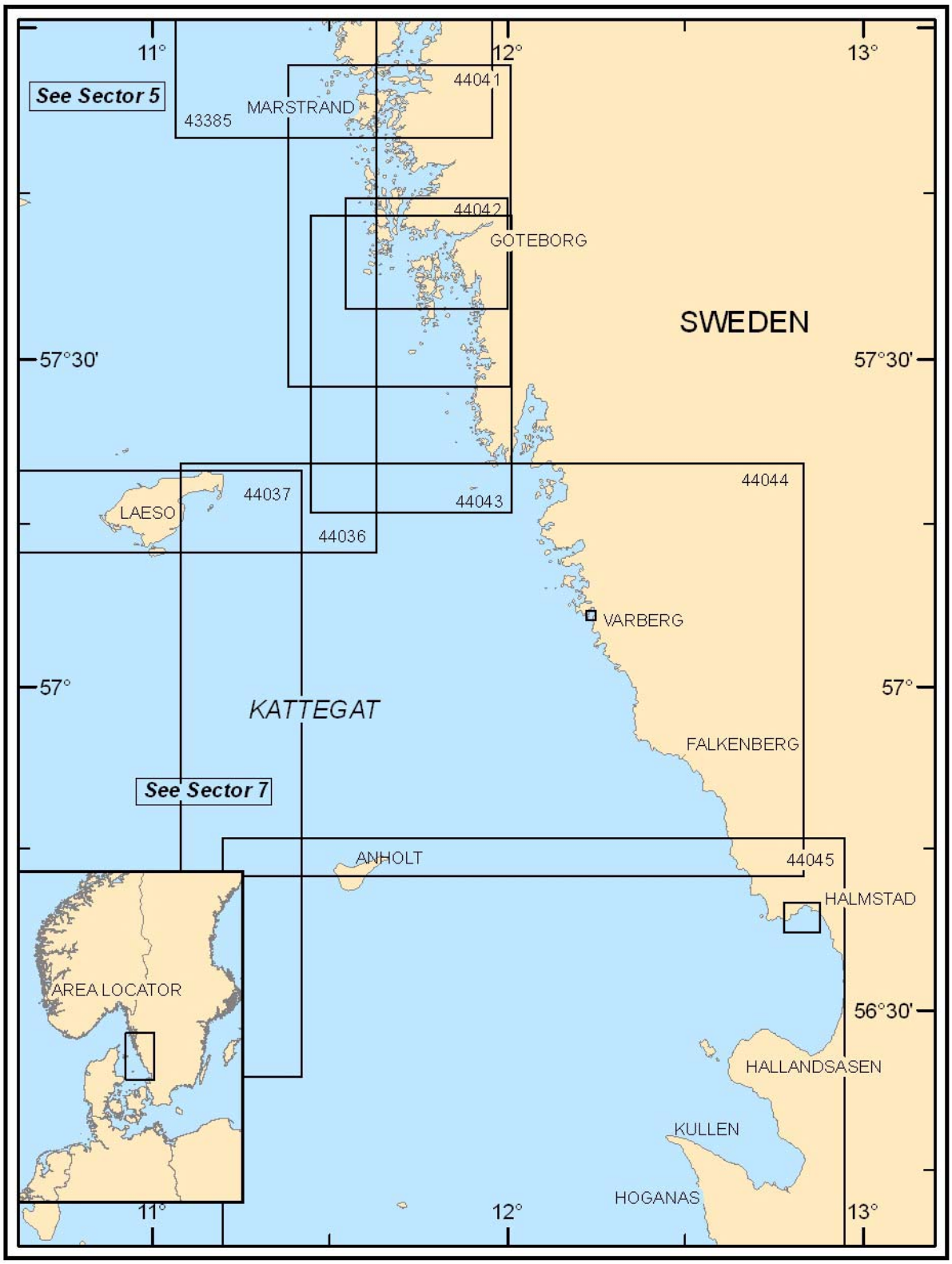
Pilotage.—Pilotage to Uddevalla is described with the approaches (see paragraph 5.16).

Regulations.—The approaches to the harbor lie within the Marstarnd VTS system area (see paragraph 5.20).

The port of Uddevalla can be contacted by e-mail, as follows:

westcoastpilot@sjofartsverket.se

Anchorage.—Vessels can obtain anchorage, in a depth of 40m, mud, within the outer part of Gustavsbergsbukten, a bay, which lies in the SE part of Byfjorden. They must remain clear of Lillon, an above-water rock fringed by a reef, which lies near the middle of the bay.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **6** — CHART INFORMATION

SECTOR 6

SWEDEN—WEST COAST—MARSTRANDSFJORDEN TO KULLEN

Plan.—This sector describes the W coast of Sweden from Marstrandsfjorden to the W extremity of Kullen, a conspicuous promontory located about 97 miles SSE.

General Remarks

6.1 The N part of the coast described in this sector is very irregular and is fronted by numerous islands, islets, rocks, and shoals. The shore is indented by a number of bays and fjords. The S part is generally low, with some inland hills, and is fringed by a number of shoals. The major ports located along the coast include Goteborg, Varberg, Falkenberg, and Halmstad.

Ice.—Ice normally forms in the inner leads, fjords, and several harbors located within the area described in this sector.

Pilotage.—Generally, pilotage is compulsory along certain fairways connecting ports along the coast in Swedish waters. Vessels subject to compulsory pilotage vary in size and type according to location; these vessels are divided into the following categories:

1. Category 1—Vessels carrying or with uncleaned tanks which last carried:
   a. Liquefied gas.
   b. Liquid chemicals defined in MARPOL73 Supplement 2, Annex 2 as category A, B, or (if vessel does not have a double-skin hull under all cargo tanks) C.
   c. Liquid chemicals which, according to the IMO bulk chemical code, should be carried in Type 1 or 2 vessels.
2. Category 2—All other chemical tankers which are laden or have uncleaned tanks and all laden oil tankers.
3. Category 3—All other vessels.

For further details, see Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

Extensive changes to pilotage procedures and VTS systems have been established to the ports described within this sector. Generally, initial order-ing of pilots for ports described within this sector should be carried out via the Swedish Vessel Reporting System (FRS) on the Swedish Maritime Administration internet website.

In exceptional cases, pilots may be ordered by e-mail, telephone, fax, or VHF. A preliminary request for pilotage should be made at least 24 hours in advance. A definitive request for pilotage must be made via the Pilot Request System at least 5 hours in advance. For additional information, see the following internet website:

Swedish Maritime Administration Home Page
http://www.sjofartsverket.se

Regulations.—Commercial vessels in Swedish territorial waters, when in the company of Swedish warships in daylight or when within 1 mile of any restricted or semi-restricted areas, are required to hoist their national flag. When at anchor in the company of Swedish warships, the national flag shall be hauled down.

Special regulations are in force with regard to the presence of aliens and foreign vessels within certain restricted and semi-restricted areas fronting the coast. Generally, foreign ships may, without permission, make use of the main channels, shipping lanes, and fairways within the restricted and semi-restricted areas. Foreign ships may also, without permission, remain within these areas for a maximum of 72 hours successively at an anchorage or mooring. For further details, see Pub. 140, Sailing Directions (Planning Guide) for the North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

Directions.—From a position located about 4 miles SW of Hatteberget Light (57°52'N., 11°28'E.), the coastal route leads SSE, passing WSW of Vinga Light (57°38'N., 11°36'E.), to a position located about 3 miles WSW of Trubaduren Light (57°36'N., 11°38'E.). It then continues SSE, passing SW of Tistlarna Light (57°31'N., 11°44'E.), to a position located about 4 miles WSW of Hallands Svartskar Light (57°22'N., 11°51'E.).

From the vicinity of Hallands Svartskar Light, the route leads SSE to a position located 2.5 miles N of Fladen Light (57°13'N., 11°50'E.). It passes clear of the approaches to Kungsbackafjorden and Vendelsofjorden. The route then leads SE and passes about 1.5 miles NE of Fladon Light. It continues SSE and parallel to the coast to a position located 7 miles WSW of Varberg.

From the vicinity of Varberg, the route leads SSE, passing ENE of Morups Bank (56°52'N., 12°13'E.), to a position located about 6.5 miles WSW of Falkenberg. It then continues SE, passing clear of the shore bank and two shallow wrecks, to a position located 4 miles WSW of Tylogrund Light (56°38'N., 12°42'E.). From this position, vessels may steer E into the approaches to Halmstad or in a SW direction to the junction of Route B and Route D (see paragraph 7.8).

An inner passage route, which is narrow in places, leads inside the many islands and islets fronting the mainland coast. Generally, the channels are authorized for small vessels with drafts up to about 4.5m. This inner passage is used only by small vessels with local knowledge.

An inshore route, which is intricate and very narrow, leads through the many dangers fronting the mainland coast. It is used only by small craft, fishing vessels, and pleasure boats. The channels are authorized for drafts up to about 3m and local knowledge is required.

Caution.—Due to the residual danger of the possible existence of bottom mines laid during WWII, vessels are cautioned against anchoring or fishing within several former NEMEDRI mine danger areas, which are located along the coast. For further information, see Pub. 140, Sailing Directions (Planning Guide) for the North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

Several submarine power cables, which may best be seen on the chart, extend between this section of the Swedish coast and

Denmark. Magnetic compasses may be affected in the vicinity of these cables.

Marstrandsfjorden to Goteborg

6.2 Hatteberget Light (57°52'N., 11°28'E.) is situated in the approaches to Marstrandsfjorden (see paragraph 5.17). The coast extending between this light and Vinga Light (57°38'N., 11°36'E.) has few natural landmarks. It is fronted by numerous islands, islets, rocks, and shoals which may best be seen on the chart.

Stora Polsan Light (57°46.5'N., 11°31.3'E.) is shown from a prominent tower, 10m high, standing on the summit of a dark rock lying 5.7 miles SSE of Hatteberget Light. Lilla Polsan, another dark rock lies 0.5 mile NE of the light and a shallow reef extends between them. Detached shoals, with a least depth of 5.4m, lie about 0.4 mile E and 1 mile NE of the light.

Stora Polsan Light

Lekskar Light (57°50.5'N., 11°35.4'E.) is shown from a structure standing on an islet lying 4.5 miles ESE of Hatteberget Light. A conspicuous beacon is situated close E of the light.

Lekskar Light and Beacon

Sor Krakan, a detached shoal with an above-water rock, lies about 2.4 miles WNW of Lekskar Light and is marked by a beacon.

Dorjeskar, a group of small islets, lies on a shoal bank, 2 miles SW of Lekskar Light. The bank, which has depths of 2 to 5m, extends about 0.6 mile N and 0.7 mile SSE from the group.

Stora Rossen, an islet, lies 2 miles NE of Stora Polan Light and a conspicuous beacon stands near its SE end. Raven, a prominent light-colored islet, lies 0.6 mile NW of Stora Rossen and has a large boulder standing on its NW side. A shoal bank, with a least depth of 1.5m, extends between these two islets. A detached shoal patch, with a depth of 1.9m, lies about 0.7 mile SSE of Stora Rossen.

The above islets and shoals form the outermost dangers in the area lying between Hatteberget Light and Stora Polan Light.

Salo Fjord, forming part of the inner passage, lies 2.5 miles SSE of Lekskar Light. A channel, which passes close N of Raven, leads in an E direction from seaward to this fjord.

6.3 Roro (57°47'N., 11°36'E.), a light-colored island, lies 2.7 miles E of Stora Polsan Light at the N end of an extensive group of islands. A prominent framework tower, 17m high, stands in its S part. A rocky reef, with depths of less than 5m, extends about 0.8 mile NNW from the end of this island.

Hyppeln (57°46'N., 11°36'E.), a light-colored island, lies close S of Roro and is surrounded by a shallow shoal bank. This island is 44m high and a prominent cairn is situated on its summit.

Stora Oset Light (57°45'N., 11°36'E.) is shown from a structure standing on the summit of a small islet lying 3.2 miles ESE of Stora Polsan Light. Buro, a small island, lies 0.8 mile E of the light and stands out due to a conspicuous white mark on its W side.

Stora Oset Light

Torrbeskar, an islet, lies on a shallow shoal bank centered about 1 mile WSW of Stora Oset Light. It is marked by a beacon which is reported to be difficult to distinguish from seaward. A detached shoal bank, with a least depth of 11m, lies about 2.5 miles W of Stora Oset Light. These are the outermost dangers in this vicinity.

Kallo Fjord lies 1 mile E of the N end of Hyppeln. It can be approached by a route leading between the S end of Hyppeln and Buro. The channel has a least depth of 6m and vessels may pass N or S of Torrbeskar and Stora Oset Light. Local knowledge is required.

6.4 **Ockero** (57°43'N., 11°39'E.), one of the larger islands fronting the coast, lies 2 miles SSE of Stora Oset Light. A conspicuous stone church, with a high dark spire, stands on the S part of this island.

Bjorko (57°44'N., 11°41'E.), a narrow island about 3 miles long, lies with its S end located 1 mile E of Hono.

Hono (57°41'N., 11°39'E.), one of the larger islands fronting the coast, lies close S of Ockero and is connected to it by a low bridge. A conspicuous white church, with a high copper spire, stands near the center of this island and a prominent water tower is situated 0.3 mile S of it. A prominent wind generator is situated on the NE extremity of the island; a conspicuous radio mast, 55m high, stands about 0.5 mile WSW of it.

Hono Huvid Light (57°41.4'N., 11°36.4'E.) is shown from a structure standing on an islet lying on an area of foul ground about 0.3 mile SSW of the W extremity of Hono.

Benskar Light (57°39.9'N., 11°36.8'E.) is shown from a structure standing on the S end of an islet lying on an area of foul ground about 1.5 miles S of Hono Huvid Light.

Benskar Light

Vinga Light and Beacon

Vinga Light (57°38'N., 11°36'E.) is shown from a prominent stone tower, 29m high, standing on the summit of an island of the same name lying about 1.8 miles S of Benskar Light. A beacon, surmounted by a sphere, is situated close SW of the light. Vinga Island is 21m high and irregularly shaped. Rocks and shoals, with depths of less than 10m, lie up to about 0.8 mile SSE and 1.4 miles SE of Vinga.

Vinga Ungar Light (57°38.2'N., 11°35.5'E.) is shown from a structure standing on a group of rocks, partly above-water, about 0.4 mile NW of Vinga Light.

Vinga Ungar Light

Viten Light (57°38.1'N., 11°37.3'E.) is shown from a structure, 9m high, standing on a detached shoal lying about 0.7 mile ENE of Vinga Light.Vinga West Approach Lighted Buoy is moored about 1,7 miles WNW of Vinga Light.

Viten Light

An extensive group of islands, islets, rocks, and shoals extends between the S side of Hono and Vinga, about 3.2 miles SSW, and may best be seen on the chart. The larger islands in the group are separated from each other by narrow passages.

Bolleskaren, a group of above-water rocks standing on an area of foul ground, lies centered 1.6 miles W of the S part of Ockero.

A detached shoal patch, with a depth of 9.2m, lies about 0.8 mile WSW of Hono Huvid Light. Detached shoal patches, with a depth of 8.5m, lie about 1.1 miles NW and 0.8 mile WNW of Benskar Light.

6.5 **Utliggarn** (57°38.2'N., 11°34.3'E.), a detached shoal bank, lies 0.7 mile W of Vinga Ungar Light. It has a least depth of 9.3m and is marked by a buoy moored at the W side.

The above rocks and shoals form the outermost dangers lying between Ockero and Vinga Light.

A number of small harbors and marinas are situated along the coast between Hatteberget Light and Vinga Light and within the groups of islands fronting the shore. These harbors have no commercial significance and are used only by small craft, local ferries, fishing vessels, and pleasure craft. The main harbors include the following;

1. Hono Rod (57°42'N., 11°38'E.).
2. Hono Klava (57°41'N., 11°39'E.).
3. Roro (57°46'N., 11°37'E.).
4. Hyppeln (57°45'N., 11°37'E.).
5. Kallo-Knippla (57°45'N., 11°39'E.).
6. Bjorko (57°44'N., 11°40'E.).
7. Halso (57°44'N., 11°40'E.).
8. Ockero (57 42'N., 11°40'E.).
9. Kalvsund (57°42'N., 11°41'E.).
10. Stora Kalvsund (57°43'N., 11°40'E.).

Approaches to Goteborg

6.6 The principal approaches to Goteborg lie NE of a line extending between Vinga Light and Tistlarna Light (57°30.6'N., 11°43.5'E.), 8.5 miles SSE.

Buskars Knote Light (57°38.3'N., 11°41.0'E.), equipped with a racon, is shown from a prominent floodlit tower, 12m high, standing at the E end of a group of rocks and foul ground lying 2.7 miles ENE of Vinga Light. It is situated at the SE side of the dangers extending S from the S side of Hono.

Buskars Knote Light

Ekeskarsbaden, a detached shoal patch, lies about 1.6 miles SW of Buskars Knote Light. It has a least depth of 7.6m and is marked close E by a lighted buoy.

Brede Bade, a shoal with a least depth of 2.6m, and Svarteskarsbaden, a shoal with a least depth of 2.7m, lie about 0.5 mile and 0.9 mile, respectively, SW of Buskars Knote Light.

Varngrund, a detached shoal patch, lies about 1.7 miles SSE of Buskars Knote Light. It has a least depth of 8m and is marked close W by a buoy.

6.7 **Trubaduren Light** (57°35.7'N., 11°37.9'E.), which is equipped with a racon, is shown from a prominent floodlit tower surmounted by a helicopter platform, 25m high, standing on a detached shoal lying 2.4 miles SSE of Vinga Light.

Trubadurien Light

Gamla Gumma, a detached shoal patch, lies about 0.7 mile N of Trubaduren Light. It has a least depth of 9.4m and is marked close S by a lighted buoy.

Sankberget, a shoal bank, lies about 1.4 miles ENE of Trubaduren Light. It has a least depth of 11m and is marked close NW by a lighted buoy.

Donso Svartskar Light (57°35.2'N., 11°43.3'E.) is shown from a structure standing on the NW side of Svartskar, an islet lying 2.9 miles ESE of Trubaduren Light.

Donso Svartskar Light

Skrapan, a detached shoal bank with a least depth of 8.8m, lies about 0.7 miles SW of Donso Svartskar Light.

Tormund, a shoal bank with above-water rocks, lies centered about 1.7 miles SSW of Donso Svartskar Light.

Hastbaden, an above-water rock, lies on a shoal bank 1.1 miles NNW of Donso Svartskar Light and is marked by a prominent beacon.

6.8 **Tistlarna Light** (57°30.6'N., 11°43.5'E.) is shown from a prominent building standing on the SW part of an islet lying on an area of foul ground, 4.6 miles S of Donso Svartskar Light.

Tistlarna Light

Matskar, a small islet, lies at the E side of the foul ground area, 0.6 mile E of Tistlarna Light, and is marked by a light. Detached shoal patches, with depth of less than 10m, lie up to about 2.6 miles SE of this islet and may best be seen on the chart.

Yttre Viten, a rock awash, lies about 1.9 miles SSE of Matskar Light. It is situated at the E side of an area of shoals with a least depth of 2.7m. This foul area, which forms the outermost danger in this vicinity, is marked by a buoy moored at its SE side.

Vanguards Grund, a detached rocky shoal bank, lies about 2 miles NW of Tistlarna Light. It has a least depth of 5.4m and is marked close W by a lighted buoy. This shoal forms the outermost danger in this vicinity.

An extensive chain of islands, islets, rocks, and foul ground, which may best be seen on the chart, fronts the mainland coast in the approach to Goteborg and lies mainly E of a line extending N from Tistlarna Light.

6.9 Vasskarsgrund Light (57°39.2'N., 11°43.3'E.), equipped with a racon, is shown from a floodlit tower, 6m high, standing 1.5 miles NE of Buskars Knote Light.

Vasskargrund Light

Trinda Brunskar Racon (57°38'N., 11°43'E.) is situated on a small islet lying 1 mile S of Vasskarsgrund Light.

Fjarskaven, a detached shoal patch, lies about 0.6 mile SSW of Trinda Brunskar Racon. It has a least depth of 3.5m and is marked by a buoy.

Botto Light and Disused Lighthouse

Brandesbroten Disused Light Tower

Botte Light (57°39'N., 11°43'E.) is shown from a tower, 10m high, standing on a rock, which lies at the S side of the entrance to South Channel, 0.3 mile S of Vasskarsgrund Light. A prominent former lighthouse building is situated close to it.

Brandnasbrotten (57°39.1'N., 11°44.2'E.), a rock, lies on the outer edge of the S shore bank, about 0.6 mile ENE of Botte. A prominent disused light structure stands on this rock.

A prominent radar mast, 12m high, stands on the NW end of Galtero, about 0.4 mile SW of Vasskarsgrund Light.

Gaveskar Light (57°39.7'N., 11°46.1'E.) is shown from a floodlit tower, 10m high, standing on a rock of the same name lying about 1.6 miles ENE of Vasskarsgrund Light.

6.10 Mavholmsbaden Racon (57°40.4'N., 11°42.4'E.) is situated at a disused light tower, 8m high and floodlit, standing on a rocky shoal lying about 1.2 miles NNW of Vasskarsgrund Light.

An extensive shoal area, with several islets and rocks, lies in the approach to Goteborg between Mavholmsbaden Racon and Vasskarsgrund Light. This shoal area extends about 2.3 miles E and may best be seen on the chart.

Stora Varholmen Light (57°41.7'N., 11°42.0'E.) is shown from a structure standing on the SW side of an island lying about 1.4 miles N of Mavholmsbaden Racon.

Gaveskar Light

Mavholmsbaden Disused Light Tower (Racon)

A number of small harbors and marinas are situated along the coast between Stora Varholmen Light and Tistlarna Light (57°30.6'N., 11°43.5'E.) and within the groups of islands fronting the shore. These harbors have no commercial significance and are used only by small craft, local ferries, fishing vessels, and pleasure craft. The main harbors include the following:

1. Vrango (57°34'N., 11°47'E.).
2. Donso (57°36'N., 11°48'E.).
3. Stytso Sandvikshamnen (57°37'N., 11°46'E.).
4. Onnered (57°38'N., 11°52'E.).
5. Fiskeback (57°38.8'N., 11°51.4'E.).
6. Saltholmen (57°39.5'N., 11°50.5'E.).
7. Soo (57°40.5'N., 11°39.9'E.).
8. Foto (57°40'N., 11°39'E.).

Aspect.—The main approach fairway is marked by lighted buoys and indicated by directional sector lights.

Brudaremossen Tower (57°42'N., 12°05'E.), 320m high, stands 4 miles E of Goteborg and is the most conspicuous landmark along this stretch of coast.

Biskopsgarden Chimney (57°43.3'N., 11°53.0'E.) stands at an elevation of 140m, about 2 miles NNW of the suspension bridge at Goteborg, and is conspicuous from seaward. It displays an aeronautical light. A prominent water tower is situated close NE of this chimney.

Slattadamm Radio Mast (57°44.1'N., 11°55.4'E.) stands at an elevation of 139m, about 2.8 miles NNE of the suspension bridge at Goteborg, and is conspicuous from seaward.

Torslanda Aeronautical Light (57°43.6'N., 11°48.4'E.) is shown at an elevation of 49m, about 4 miles NW of the suspension bridge at Goteborg.

Stora Ros (57°36.5'N., 11°47.1'E.), a conspicuous cairn, stands on the summit of a steep hill rising on Styrso Island, 2.4 miles NE of Donso Svartskar Light.

Stora Kanso Tower (57°37.'N., 11°44.9'E.), 10m high, stands about 1.8 miles SSE of Vasskarsgrund Light and is prominent.

Two prominent radio masts stand, at an elevation of 137m, about 2.8 miles SSE of the suspension bridge at Goteborg.

Directions.—The principal deep-water approach route to Goteborg, which may best be seen on the chart, leads in a NNE direction for about 5 miles to the vicinity of Buskars Knote Light (57°38.3'N., 11°41.0'E.) from a position located 2 miles S of Trubaduren Light. It then leads through Vinga Sand (57°39'N., 11°42'E.), Dana Fjord (57°40'N., 11°42'E.), and Hake Fjord (57°40.5'N., 11°44.5'E.).

From the vicinity of Buskars Knote Light, the track leads in a N direction and enters North Channel, a fairway marked by lighted beacons, at a position located about 0.8 mile SW of Mavholmsbaden Racon (57°40.4'N., 11°42.4'E.). This fairway channel, with a dredged depth of 20.5m, leads NE through Dana Fjord and rounds Mavholmsbaden Racon. It then continues in an E direction through Hake Fjord to the harbor facilities.

This principal approach route is authorized for drafts up to 18.9m as far as Torshamnen Oil Terminal.

An alternate main entrance route, South Channel, leads in an ENE direction for 2.5 miles to the vicinity of Gaveskar Light (57°39.1'N., 11°46.1'E.) from NE of Buskars Knote Light. It passes between Botto and Vasskarsgrund Light. From close SSE of Gaveskar Light, the route then continues NE for 2 miles and passes through Rivo Fjord (57°40'N., 11°47'E.). It then joins the principal deep-water route close SW of Knippelholmen.

This alternate main approach route, which is slightly shorter than the deep-water route, is authorized for drafts up to 10m. It is reported that South Channel is being dredged to allow authorized drafts of up to 13m.

A secondary approach route from seaward, which is known as Vingaleden, leads into Vinga Sand (57°39'N., 11°42'E.). From the vicinity of Vinga West Approach Lighted Buoy (57°39'N., 11°33'E.), the route leads ESE for 2 miles, passing NNE of Utliggarn Shoal, Vinga Ungar Light, and Vinga Light. It then leads in an ENE direction for 3 miles and joins the entrance routes in Vinga Sand. The primary track passes close N of Viten Light and about 0.4 mile N of Buskars Knote Light. This route is authorized for drafts up to 8.5m by day and up to 6.5m at night.

An inner passage route leads to Goteborg through the islands and islets lying in the N approaches. It passes through Stora Sillesund (57°51.4'N., 11°33.2'E.), Salo Fjord (57°48.9'N., 11°37.7'E.), Kallo Fjord (57°46'N., 11°39'E.), and Stora Kalvsund (57°43'N., 11°40'E.) into the NW part of Dana Fjord. This route is authorized for drafts up to 4.5m. It is intricate and narrow in places. Local knowledge is required.

An inshore route leads through the islands and islets which lie in the N approaches. It leads from Algo Fjord (57°55'N., 11°40'E.) through Insto Ranna to a position located close E of Lango Island (57°51'N., 11°39'E.). From Lango Island, a channel leads SE to Nordre Alvs Fjord (57°46'N., 11°43'E.). It then passes E of Bjorko and continues S into Dana Fjord. An alternate channel leads S from the vicinity of Lango into Salo Fjord and joins the inner passage. This inshore route is authorized for drafts up to 3.2m.

An inner passage route leads to Goteborg through the islands and islets lying in the S approaches. From a position located about 3.8 miles SE of Matskar Light, the route leads NNE and N for 12 miles. It passes E of Vrango (57°34'N., 11°47'E.), E of Dono (57°36'N., 11°48'E.), and then joins the main approach route in Rivo Fjord. This route can also be approached from seaward. From a position located 3.6 miles SE of Matskar Light, the track leads N for 4 miles and NE for 0.8 mile. It passes about 0.6 mile E of Yttre Viten (57°29'N., 11°47'E.) and joins the inner route at a position located about 2.6 miles NE of Matskar Light.This inner passage route is authorized for drafts up to 7m. Local knowledge is required.

Caution.—A spoil ground area, which may best be seen on the chart, lies centered 2 miles WNW of Trubaduren Light.

A submarine cable, which may best be seen on the chart, extends in a N direction between Trubaduren Light and Vinga.

A restricted area, which may best be seen on the chart, lies centered 2.5 miles SE of Botto (57°39'N., 11°43'E.).

Restricted areas, within which fishing is prohibited, lie centered 1.2 miles NW and 1 mile SW of Buskars Knote Light and may best be seen on the chart.

Due to complicated tidal currents setting across the channel in Vingaleden, this approach route requires local knowledge (see Directions).

The direction of buoyage in the S approaches to Goteborg is N to S.

High speed ocean-going ferries may be encountered in the approaches to the port.

Defensive minefields, which are shown on the chart, are situated within the approaches, as follows:

1. In an area lying between the W side of Bjorko, the S end of Kallo, and the E side of Halso (57°44'N., 11°39'E.).
2. In an area, 1.4 miles wide, extending about 3 miles N across the main approach channels from the vicinity of Trindd Brunskar Racon (57°38'N., 11°43'E.).
3. In an area lying between the NE end of Donso, the SE end of Kopstadso (57°37.5'N., 11°48.6'E.), the SW end of Stora Roso (57°38.2'N., 11°51.1'E.), and the W side of Langholmen (57°37.8'N., 11°51.7'E.).

Vessels are warned not to anchor in these areas and they should not pass through them during thunderstorms. If anchoring becomes essential due to an emergency, vessels should anchor as near to the outer limit of the mined area as possible.

It is reported that extensive dredging and changes to navigational aids are being carried out in the approaches to the port.

It should be noted that the new lights marking the edges of the dredged fairways in North Channel and South Channel are situated at the outer ends of arms extending horizontally from the permanent beacon structures.

Anchorage.—Three designated anchorage areas, the limits of which may best be seen on the chart, lie in the outer approaches, as follows:.

1. Area A, used by VLCCs, lies centered 2.5 miles SW of Trubaduren Light and has depths of 40 to 65m.
2. Area B lies centered 2.5 miles SSE of Trubaduren Light and has depths of 21 to 44m.
3. Area C lies centered 1.5 miles E of Trubaduren Light and has depths of 22 to 32m.

Goteborg (Gothenberg) (57°42'N., 11°57'E.)

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6.11 Goteborg, an extensive commercial port, is situated at the mouth of the Gota River and serves a large industrial area. It is connected to the Baltic Sea by a series of canals and inland waterways. The old town, standing on the S bank of the river, is connected to the new town by several bridges. The modern industrial town of Molndal stands 2 miles S of Goteborg.

Ice

The port of Gothenberg and its approaches are kept open throughout the winter months by powerful icebreakers.

Winter Navigation.—Under Swedish Maritime Administration Icebreakers Division operates a fleet of ten icebreakers deployed around the Swedish coast during the winter months, that maintains a 24-hour operatioon at the Center, in Gothenburg.

For further details, see Pub. 140, Sailing Directions (Planning Guide) for the North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

Tides—Currents

There is usually an outgoing current which attains a rate of 0.5 to 1 knot, depending upon meteorological conditions. Within the harbor, the current may attain a rate of 2 knots. The normal tidal range is about 0.2m.

The water level in the approaches ranges from about 1.2m above mean level to about 0.5m below it. Strong winds from SW to NW, especially in the fall and winter, raise the level while strong winds from SE to NE, especially in late winter and spring, lower the level.

Depths—Limitations

The main commercial port facilities extend for about 8 miles. The specialized basins for tankers, container vessels, and ro-ro ferries are situated along the N side of the main fairway.

The main entrance fairway (North Channel) is dredged to a depth of 20.5m as far as Torshamnen Oil Terminal and is authorized for drafts up to 18.9m (see Directions in paragraph 6.10). Between this oil terminal and Skarvikshamnen, 2.7 miles E, the fairway is dredged to a depth of 13m. Between Skarvikshamnen and Cityvarvet, 2.5 miles E, the fairway is dredged to a depth of 10m. Between Cityvarvet and Frihamnen, 0.5 mile NE, the fairway is dredged to a depth of 8.5m. Above Frihamnen, the fairway is dredged to a depth of 5.3m.

The harbor is spanned by three main bridges. The Alvsborgs Bridge, the outermost, is a suspension bridge which spans the river 2.7 miles above Knippelholmen. It has a vertical clearance of 45m over a navigable passage, 100m wide, which is indicated by floodlit bluish-white marks painted on the bridge. The maximum air draft allowed is 43m.

The Gotaalv Bridge, a bascule bridge, spans the river 2.5 miles above the Alvsborgs Bridge and carries both road and rail traffic. The central span, which opens vertically, provides a navigable passage, 20m wide. It has a vertical clearance of 19.5m when closed. The passages under the two side spans are 27m wide and have vertical clearances of 18.5m. Vessels must always use the side passages unless they are prevented from doing so by the height of their masts. Vessels bound upstream must use the passage on the S side and those bound downstream must use the passage on the N side.

The Marieholms Bridge, a railroad bridge, spans the river 1.2 miles above the Gotaalv Bridge. It has a swinging span which provides a navigable passage, 15.5m wide, on each side of the center. Vessels proceeding upstream should use the passage on the E side and those proceeding downstream should use the passage on the W side.

Torshamnen Oil Terminal (57°41'N., 11°48'E.) is located on the W side of Hjartholmen Island. The jetty, which handles crude oil, has two berths. The berth at the E side has a depth of 18m alongside; the berth at the W side has a depth of 19.6m alongside. Tankers up to 225,000 dwt, 351m in length, and 18.9m draft can be accommodated.

Svenska Shell Terminal is located at the E side of Hjartholmen. It provides two berths, with depths of 4.5 to 9.5m alongside.

Two quays, used for loading stone, are located at the W side of Stora Risholmen, about 0.5 mile NNE of Torshamnen Oil Terminal. The berths have depths of 6.5m alongside and can handle vessels up to 85m in length.

Arendal Ro-Ro Terminal, situated on the former site of a shipyard, is located 0.6 mile N of Knippelholmen. The quay at the N side of the basin is 400m long and the quay at the E side of the basin is 200m long. They have depths of 8.1m alongside.

Goteborg—Ro-Ro Terminal

Skandiahamnen, located E of Arendal Ro-Ro Terminal is divided into Alvsborgshamnen, Skandia Terminal, and Tor Terminal.

Goteborg—Container Terminal

Goteborg—Sarvik Oil Terminal

Alvsborgshamnen, a paper terminal, provides ten ro-ro berths, 130 to 265m long, with depths of 6 to 11m alongside. Vessels up to 160m in length can be handed.

Skandia Terminal provides a main container quay, 562m long, with a depth of 12m alongside. In addition, there are five ro-ro berths, 50 to 215m long, with depths of 6 to 12m alongside.

Tor Terminal provides four ro-ro berths, with depths of 8 to 10m alongside, and can handle vessels up to 145m in length.

Skarvikshamnen, an oil and chemical terminal, is located close E of Skandia Terminal and about 0.7 mile W of the Alvsborgs Bridge. It provides 16 berths, with depth of 7 to 13m alongside. Tankers up to 40,000 dwt and 280m in length can be handled.

Ryahamnen, located close W of Alvsborgs Bridge, is used by coastal tankers up to 25,000 dwt. It provides 15 berths, with depths of 4 to 9m alongside, and can handle vessels up to 180m in length.

Sannegardshamnen, a general cargo terminal, is situated 1 mile NE of Alvsborgs Bridge. It provides ten berths, up to 540m long, with depths of 6.5 to 7m alongside.

Lindholmshamnen, a vehicle terminal, is situated 1.5 miles NE of Alvsborgs Bridge. It has ten berths, up to 300m long, with depths of 4.4 to 10m alongside.

Frihamnen, the free port, is located on the N side of the river opposite the City Center and close below the Gotaalv Bridge. It consists of three basins and is used by general cargo, cruise, and passenger ferry vessels. There are 19 berths with depths of 3 to 9m alongside.

Goteborg

Goteborg Waterfront

Fiskehamnen, a fishing basin, is situated on the S side of the river, 1 mile E of the Alvsborgs Bridge. It has 900m of berthage with depths of 4 to 7m alongside.

Majnabbehamnen, a quay with ro-ro ramps, is situated on the S side of the river, 0.6 mile E of the Alvsborgs Bridge. It provides four berths, 60 to 150m long, with depths of 3 to 8m alongside.

Stigbergskajen, a quay with ro-ro ramps, is situated close E of Fiskehamnen. It is about 500m long and has depths of 7 to 8m alongside.

Masthuggskajen, a quay with ro-ro ramps, extends E from Stigbergskajen. It is about 900m long and has depths of 6.5 to 7.6m alongside.

A ship-building yard (Eriksberg) is situated on the N side of the river, 0.5 mile above the Alvsborgs Bridge. The dry dock is 332m long, 46m wide, and has a depth of 6.1m over the sill at MHWS.

Cityvarvet, the main repair yard, is situated 2 miles NE of the Alvsborgs Bridge. It has several fitting-out quays and a floating dock. The dock is 268m long, 34.7m wide, and can handle vessels up to 70,000 dwt.

The Trollhatte Kanal in conjunction with the Gota Alv River connects Goteborg to the small port of Vanersborg (58°23'N., 12°20'E.) at the S end of Lake Vanern. The route is 46 miles long and has six locks, each 90m in length, 13.4m wide, with a minimum depth of 5.6m. Generally, vessels up to 87m in length, 12.6m beam, 27m air draft, and 4.7m draft can transit the canal. With special permission, vessels up to 88m in length, 13.2m beam, and 5.4m draft can transit the canal. Vanersborg provides 155m of quayage, with a depth of 3m alongside, and 220m of quayage, with a depth of 6m alongside.

The Gota Kanal, via Lake Vattern, extends from the E side of Lake Vanern to Mem (58°29'N., 16°25'E.), but is used only by small craft and pleasure boats.

Aspect

The main entrance fairway is marked by lighted buoys and lighted beacons.

Five prominent wind generators, 30m high, stand between

Goteborg Harbor

Goteborg—Ferry Harbor

Goteborg Harbor—The Alvsborg Bridge

the N and S ends of Hjartholmen (57°41.2'N., 11°47.7'E.), an island lying on the N side of the main channel. Anothet five wind generators are situated on the small peninsula lying 0.3 mile E of Hjartholmen.

Knippelholmen (57°41'N., 11°49'E.), an islet, lies on the N side of the river, about 0.7 mile E of the S end of Hjartholmen. A prominent disused light tower, 6m high, stands on the SE end of this islet; a floodlit beacon is situated on its SW side.

Nya Alvsborg Fort, a conspicuous fortress with a tower, stands on an island lying on the N side of the river, about 1.3 miles E of the S end of Hjartholmen.

Dynan, a detached rocky islet, lies on the S side of the main fairway, about 1.1 miles NE of Gaveskar Light. A prominent floodlit disused light tower stands on this islet.

The Alvsborgs Bridge, a high suspension bridge, spans the river 2 miles above Nya Alvsborg Fort and is conspicuous. The Gotaalv Bridge, a bascule bridge, spans the river 2.5 miles above this high suspension bridge.

A conspicuous chimney, 110m high, stands on the S side of the river, 0.8 mile SW of the Gotaalv Bridge. A prominent water tower and a tower surmounted by a gilded crown are situated about 0.7 mile SW and 0.7 mile SSE, respectively, of this chimney.

For additional landmarks, see Approaches to Goteborg in paragraph 6.6.

Pilotage

The Goteborg Pilotage Area extends in the approaches to the mainland between latitudes 57°16'N and 57°50'N. Pilotage within the area is compulsory (see paragraph 6.1) for the following:

1. Trubaduren to Goteborg:
   a. All Category 1 vessels.
   b. Category 2 vessels of 100m length or 17m draft and over.
   c. Category 3 vessels of 110m length or 18m draft and over.
2. In certain channels N of Vinga and between Vinga and Marstrand through the archipelago:
   a. All Category 1 vessels.
   b. Category 2 vessels of 70m length, 14m beam, and 4.5m draft and over.
   c. Category 3 vessels of 70m length, 14m beam, and 4.5m draft and over.

Generally, initial ordering of pilots should be carried out via the Swedish Vessel Reporting System (FRS) on the Swedish Maritime Administration internet website (see paragraph 6.1). In exceptional cases, pilots (call: Goteborg Pilot) may be ordered by telephone or on VHF channel 73. A preliminary request for pilotage should be made at least 24 hours in advance. A definitive pilotage request must be made via the Pilot Request System at least 5 hours in advance.

Pilots can be contacted by VHF and board in the following positions:

1. No. 1 lies 1.2 miles SE of Trubaduren Light.
2. No. 2 lies 2.5 miles SW of Vinga Light.
3. No. 3 lies 2 miles WNW of Vinga Light.

4. VLCC in position (57°38.5'N., 11°29.5'E.).
5. Skandiahamnen (57°41.3'N., 11°52.2'E.).

Deep-sea pilots for the North Sea and Kattegat are also available from this pilot station. Vessels should send their request and ETA at least 24 hours in advance.

Pilots for the Trollhatte Kanal and Lake Vanern change over in position (57°41.3'N., 11°52.2'E.).

Regulations

Traffic Control.—A Vessel Traffic Service (VTS) system operates in the approaches to Goteborg and is controlled by the Traffic Control Center (TCC) at Klippan (57°41.6'N., 11°51.7'E.). It is mandatory for all vessels over 300 grt and all vessels, including tows, exceeding 50m in length.

The VTS area is bound on the W side by the arc of a circle, radius 6 miles, centered on Vinga Light (57°38'N., 11°36'E.). This circle is divided into eight sectors designated from N to U in a counterclockwise direction.

Reporting Points are, as follows:

1. N—position 57°43.9'N, 11°42.3'E. (inbound only)
2. O—position 57°43.9'N, 11°39.8'E. (inbound only)
3. P—position 57°43.8'N, 11°33.9'E. (inbound only)
4. Q—position 57°41.2'N, 11°26.8'E. (inbound only)
5. R—position 57°36.7'N, 11°25.1'E. (inbound only)
6. S—position 59°32.9'N, 11°29.9'E. (inbound only)
7. T—position 57°31.9'N, 11°38.3'E. (inbound only)
8. U—position 57°31.9'N, 11°48.4'E. (inbound only)

All inbound vessels must send an Entry Report to the Traffic Center on VHF channel 13, 30 minutes before entering the VTS area. This report must include the vessel's name, call sign, position, intended route, destination, and any deficiency the vessel may be experiencing.

All vessels must keep a continuous watch and contact the Traffic Center on VHF channel 13 when W of the Gotaalv Bridge. When on the E of this bridge, vessels must keep a continuous watch and contact the Traffic Center on VHF channel 9.

Each vessel must send its name, call sign, position, in-tended route (vessels inbound from sea must state in which sector they will cross the area limit) and destination to the Traffic Center, as follows:

1. Passing Buskars Knote Light (57°37.1'N., 11°40.8'E.) (N-bound only).
2. N of Vinga (57°38.3'N., 11°39.1'E.) (E-bound only).
3. Knippelholmen (57°41.0'N., 11°50.5'E.) (W-bound only).
4. Arendal (57°41.3'N., 11°49.3'E.) (S-bound only).
5. Passing the Gotaalv Bridge (57°42.9'N., 11°57.9'E.) (W-bound only).

Vessels must also report (Incident Report) any incident such as grounding or collision and any defects (Defect Report), which may affect unsafety navigation.

Any change to an intended route must be reported (Deviation Report) stating the reasons for changes.

Radar surveillance covers the area seaward of the Alvborgs Bridge. Radar assistance is available to large tankers on request and to other vessels with defective radar in poor visibility.

The VTS Traffic Center and pilot station may be contacted by e-mail, as follows:

westcoastpilot@sjofartsverket.se

The port of Goteborg may be contacted as follows:

Goteborg Home Page
http://www.sjofartsverket.se

General.—VLCCs berth and unberth in daylight only.

All tankers over 30,000 dwt, loaded or in ballast with no gas-free tanks, are required to be escorted by a tug on entry and departure between Trubaduren Light (57°36'N., 11°38'E.) and any berth.

A vessel crossing the river shall give way to a ship proceeding up or down the river.

Speed limits are in force within the harbor.

Vessels lying at the quays or piers of the city may not make any sound signals on their whistles or move their engines at any time except immediately before their departure. One long blast may be sounded if it is necessary to test the engines.

Anchorage

Anchorage can be taken, in depths of 20 to 30m, clay, in the W part of Dana Fjord, outside the buoyed channel. However, strong winds from SW raise a heavy swell in this anchorage.

Sheltered anchorage can be taken, in depths of 12 to 14m, clay, in Rivo Fjord about midway between Gaveskar Light and Dynan Light.

Caution

It is reported that depths less than charted may be found within the port in the river area extending E of Skandia Terminal (57°41'N., 11°51'E.).

Numerous submarine pipelines and cables, which may best be seen on the chart, lie within the harbor area.

Water turbulence may be experienced in the vicinity of Cityvarvet, the main repair yard, when ship's engines are being tested.

Goteborg to Kullen

6.12 Kungen Light (57°27'N., 11°50'E.) is shown from a prominent tower, 8m high, standing on a rocky islet of the same name lying on a shoal, 5 miles SE of Tistlarna Light.

Tranebrakorna, an area of foul ground with several above-water rocks, lies centered 0.6 mile N of Kungen Light and is marked on its E side by a buoy. A detached shoal, with a least depth of 9m, lies about 0.4 mile N of this foul area.

Hallands Svartskar Light (57°22'N., 11°51'E.) is shown from a prominent tower, 7m high, standing on Svartskar, a dark islet lying 4.6 miles SSE of Kungen Light. Detached shoal patches lie up to about 2.3 miles S and 2.5 mile SSW of the light and may best be seen on the chart.

A chain of detached rocks and shoals extends between Kungen Light and Hallands Svarskar Light. It lies about 3.5

miles off the mainland coast and may best be seen on the chart.

Vastra Ron and Ostra Ron, are two high islets, which lie on foul ground about 1.7 miles S of Kungen Light.

Langen, with a least depth of 8.2m, and Rovaren, with a least depth of 16m, lie centered about 2.8 miles NW and 2.9 miles SW, respectively, of Hallands Svarskar Light. These detached shoal patches form the outermost dangers in this vicinity.

Skallaren, a detached shoal with a least depth of 9.1m, lies about 2 miles SSW of Hallands Svarskar Light. Grundabade, a detached shoal patch, lies about 1.4 miles S of Hallands Svarskar Light. It has a least depth of 1.8m and is marked by a buoy. These two shoals form the southernmost dangers in this vicinity.

6.13 Saro (57°30'N., 11°55'E.) is a high wooded peninsula located on the mainland coast, 6.4 miles E of Tistlarna Light. This peninsula is conspicuous because of its contrast against the adjacent barren area. Foul ground, covered by numerous rocks and islets, extends up to about 2.2 miles W from the seaward side of this peninsula.

A conspicuous radio mast stands 1.4 miles SE of the SW extremity of Saro. A prominent church, with a high pointed tower, is situated at Vallda, 2.6 miles SE of Saro.

Hallsundsudde (57°21'N., 12°00'E.), a mainland peninsula, is located 5 miles ESE of Hallands Svartskar Light and is marked by a beacon. A detached shoal patch, with a least depth of 6.9m, and a wreck, with a depth of 11.9m, lie about 0.3 mile and 1.3 miles, respectively, S of the S end of this peninsula.

Monster, a broad peninsula, is located 1.4 miles W of Hallsundsudde; a prominent disused lookout tower stands on its S part.

The coast between Saro and Hallsundsudde is low and mostly featureless. The shore is fringed by numerous islands, lets, rocks, and areas of foul ground which may best be seen on the chart.

Four conspicuous radio masts stand on the mainland 3.6 miles NE of Hallands Svartskar Light. A prominent white church, with a low tower and black spire, is situated at Onsala, about 2.5 miles E of the masts.

A conspicuous dish aerial and the prominent dome of a space observatory are situated about 1.2 miles SSW of the radio masts.

A number of small harbors and marinas are situated along this stretch of coast and within the groups of islands and islets fringing the shore. These harbors have no commercial significance and are used only by small craft, local ferries, fishing vessels, and pleasure craft. Local knowledge is required. The main harbors include the following:

1. Vallda Sando (57°29.4'N., 11°55.9'E.).
2. Lerkil (57°27.5'N., 11°54.9'E.).
3. Ockerosund (57°23'N., 11°56'E.).
4. Malo Hamn (57°22N., 11°59'E.).
5. Skalla Hamn (57°22'N., 12°00'E.).

6.14 Malo (57°20'N., 11°58'E.), a low island, lies on a shoal bank 1 mile W of Hallsundsudde and is marked by a light at its S end. This island is barren and yellowish in color. Malo Rose, a large cairn, stands on the summit which rises in the NE part of the island. Shoals, with depths of less than 10m, extend up to about 1 mile W of the W extremity of the island and up to about 1.2 miles WSW of the S end of the island. A detached shoal patch, with a least depth of 7.7m, lies about 1.5 miles WSW of the S end of the island and is marked by a buoy.

Skarvgr, a detached shoal bank, lies 1.1 miles NW of the W extremity of Malo. It has a least depth of 1.3m and is marked by a buoy at the NW side.

Malosund, a narrow channel, lies between the N side of Malo and the mainland. It has a least depth of 6m but the currents are very strong. Local knowledge is required.

Nidingen (57°18'N., 11°54'E.), a low and sandy islet, lies 3 miles SSW of Malo and is surrounded by shoals and reefs, with rocks awash in places.

A light is shown from a prominent tower, 23m high, standing on the W part of the islet. Two conspicuous disused light towers are situated close NE of the light and two beacons stand on the E part of the islet.

Nidingen Light and Disused Light Towers (two)

6.15 Lilleland Light (57°18'N., 11°56'E.) is shown from a prominent floodlit tower, 21m high, standing on the NE extremity of the reefs surrounding the islet, 0.9 mile ENE of Nidlingen Light.

Lilleland Light

Sodra Bredaberg, a detached shoal patch, lies about 1.1 miles SSW of Lilleland Light. It has a least depth of 5.5m and is marked by a buoy. A detached shoal, with a least depth of 10.5m, lies about 0.7 mile WSW of Sodra Bredaberg.

Klockfoten, a detached shoal patch with a least depth of 10.9m, lies 1 mile WSW of Nidlingen Light. Langbaden, a detached shoal, lies about 1.1 miles SW of Nidlingen Light. It has a least depth of 8.2m and is marked close SW by a lighted buoy. These four shoals form the outermost dangers in this vicinity.

Directions.—An inner passage route, authorized for drafts up to 7m, leads between the off-lying dangers and those fringing the mainland coast. Local knowledge is required, particularly at night.

From a position located 2 miles ESE of Nidingen Light, the track leads NW for about 3 miles and then NNW for about 5.5 miles toward Kungen Light. It passes about 0.4 mile NE of Lilleland Light, 1 mile WSW of the W extremity of Malo, and 0.8 mile ENE of Hallands Svartskar Light. From a position located about 1.8 miles SSE of Kungen Light, the track continues in a N direction for 3.5 miles and joins the route leading though the S approaches to Goteborg, as described in paragraph 6.10.

Caution.—Several submarine cables, which may best be seen on the chart, extend NE between Nidingen and the mainland.

Due to residual danger from mines buried on the bottom, vessels are cautioned not to carry out any seabed activities within a large area lying centered 2 miles S of Nidingen. This area extends NW and NE of Nidingen and may best be seen on the chart.

6.16 Kungsbackafjorden (57°21'N., 12°03'E.) is entered between Hallsundsudde and Nasbokrok, 2 miles E. This fjord extends in a N direction for about 7.5 miles and provides sheltered anchorage for a large number of vessels in its W part.

Fjordskar, an islet, lies about 0.7 mile NE of the SE end of Hallsundsudde and is marked by a light. Several other islets lie in the fjord but most are located within 1.2 miles of the E shore. Gottskar, a resort, is situated at the W side of the fjord, about 3.5 miles above the entrance, and is fronted by a small fishing harbor.

Vessels may anchor, in depths of 8 to 18m, clay with good holding ground, between Gottskar and Kalvo, 2.5 miles NE. The channel leading into the fjord has a controlling depth of 10m. At a position about 4.7 miles above the entrance, the fjord shoals rapidly toward the head. Ice frequently closes this fjord to navigation from December to March. Local knowledge is advised.

6.17 The mainland coast between Kungsbackafjorden and Varberg, about 15 miles SSE, is mostly low with some inland hills. The shore is fringed by numerous islands, islets, rocks, and shoals which extend up to about 3 miles seaward and may best be seen on the chart.

Texelberget, 180m high, stands about 10 miles ENE of Nasbokrok, the SE entrance point of Kungsbackafjorden. This hill rises steeply on its SE side and is conspicuous from seaward of Nidingen.

Vendelsofjorden (57°18'N., 12°08'E.), a bay, lies between Nasbrokrok and Ringhals, a point located 5 miles S. It is encumbered by a number of islets and shoals.

Vendelso, a large islet, lies 1.5 miles WSW of Espenasudde, a headland located near the middle of the E shore, and is connected to it by a shallow bank. A chain of small islets and shoals extends about 3 miles SW from this islet and may best be seen on the chart.

Anchorage, sheltered from all but SW winds, can be taken, in depths of 7 to 10m, sand and shingle, about 0.3 mile E of the SE part of Vendelso and clear of the cables to the N. Vessels with drafts up to 7m can approach this roadstead. Local knowledge is advised.

Batfjorden (57°14'N., 12°06'E.), a small fjord, is entered close S of Ringhals. Its outer part contains a number of harbors used by fishing vessels and small craft. A radio mast and a water tower, both prominent, stand about 0.6 mile NE and 0.7 mile SE, respectively, of the fjord entrance. A conspicuous chimney, 113m high, is situated at a power plant, 1.2 miles NNE of the entrance.

Videberg Kraftverkenshamn (Ringhals), serving the power plant, is situated on the N side of the fjord. It provides a quay, 65m long, with a depth of 6m alongside and a ro-ro berth at the NW end.

A buoyed channel, 60m wide, leads through the offshore dangers into the fjord and is dredged to a depth of 6m. An outer approach lighted buoy is moored about 1.4 miles W of the entrance.

6.18 Klaback Light (57°09'N., 12°06'E.) is shown from a structure standing on a rock lying on a detached area of foul ground, 5.5 miles S of the entrance to Batfjorden. This foul area forms the outermost danger in this vicinity.

Klaback Light

Balgo, a large islet, lies 2 miles ENE of Klaback Light. It is located on an area of foul ground which extends seaward from the mainland shore almost to the light.

Fladen (57°10'N., 11°45'E.), an extensive off-lying shoal bank, lies centered about 12 miles W of Klaback Light. It has a least depth of 5.9m and may best be seen on the chart.

Fladen Light (57°13'N., 11°50'E.), equipped with a racon, is shown from a prominent floodlit tower, 26m high, standing on the NE side of Fladen, 5.9 miles SSW of Nidingen Light.

Several small harbors are situated along the coast between Kungsbackafjorden and Varberg and within the groups of islands and islets fringing the shore. These harbors have no commercial significance and are used only by small craft, local ferries, fishing vessels, and pleasure craft. Local knowledge is required. The main harbors include the following:

1. Nortorp (57°19.5'N., 12°09.3'E.).
2. Starder (57°17'N., 12°08'E.).
3. Videberg Fiskehamn (57°15'N., 12°07'E.).
4. Bua Hamn (57°14.5'N., 12°06.9'E.).

Caution.—A submarine pipeline extends about 2.8 miles WSW from a point on the coast located 3.9 miles NNE of

Fladen Light

Klaback Light. The pipeline is marked by buoys and its seaward end is marked by a lighted buoy.

Varberg (57°07'N., 12°15'E.)

World Port Index No. 24030

6.19 Varberg is situated on the mainland SE of Getteron, a peninsula. The harbor, which serves an industrial area, faces SSW and is protected by two stone breakwaters.

Varberg Home Page

http://www.terminalwest.se

Tides—Currents.—The tidal range is about 0.6m. The water level rises with W winds and falls with S winds. The maximum range occurs in the spring and autumn.

Depths—Limitations.—Farnyet, an above-water rock, lies on a shoal about 4 miles NW of Subbeberget Light. Kalkgrund, a rocky spit, extends about 0.6 mile S from the SW extremity of Getteron. It is partly awash and marked by a buoy. The above rock and spit form the outermost dangers in the NW approach to the port.

An approach channel, dredged to a depth of 11m over a width of 100m, leads NNE through the off-lying dangers for about 2 miles to the harbor.

The port provides about 1,500m of total quayage. The outer harbor has a depth of 11m. Farehamnen, the main commercial berth, is 270m long and has a depth of 11m alongside. The inner harbor basin has a depth of 8m. The main quay, located at the E side, is 650m long and has depths of 4 to 8m alongside.

There are facilities for tankers, general cargo, ro-ro, ferry, passenger, timber, and fishing vessels. Vessels up to 215m in length, 33m beam, and 10m draft can be accommodated.

Aspect.—Subbeberget Light (57°05.3'N., 12°14.3'E.) is shown from a prominent tower, 14m high, standing in the S part of Varberg, 5.7 miles SE of Klaback Light.

Approach Lighted Buoy is moored about 0.5 mile W of Subbeberget Light and marks the seaward entrance of the approach channel.

Grimeton Aeronautical Light, 65m high, is shown from the tallest, of a group of seven conspicuous radio masts standing 5 miles ENE of Subbeberget Light.

Subbeberget Light

Varberg Fort

A conspicuous fort stands 0.9 mile NNE of Subbeberget Light at the W side of the city. A water tower, which resembles a castle, and a prominent white church, located on high ground, are situated 1.7 miles NE and 2.3 miles ENE, respectively, of Subbeberget Light.

Pilotage.—Pilotage to Varberg is compulsory for the following vessels (see paragraph 6.1):

1. All Category 1 vessels.
2. Category 2 vessels of 80m in length or 15m beam and over.
3. Category 3 vessels of 90m in length, 16m beam, or 5.5m draft and over.

Generally, initial ordering of pilots should be carried out via the Swedish Vessel Reporting System (FRS) on the Swedish Maritime Administration internet website (see paragraph 6.1). In exceptional cases, pilots (call: Varberg Pilot) may be ordered by telephone: 46-3-647772 or on VHF channel 19. A preliminary request for pilotage should be made at least 24 hours in advance. A definitive pilotage request must be made via the Pilot Request System at least 5 hours in advance.

Pilots can be contacted by VHF and board in the vicinity of the Approach Lighted Buoy (57°04'N., 12°11'E.) also via:

westcoastpilot@fjofartsverket.se

Varberg Pilot Home Page

http://www.fjofartsverket.se

Regulations.—A Vessel Traffic Service (VTS) system operates in the approaches to the coast in the vicinity of Varberg. The VTS area limit is indicated by the arc of a circle with a radius of 3 miles centered on Subbeberget Light (57°05.3'N., 12°14.3'E.).

The VTS system is mandatory for all vessels of 45m in length and over, all vessels of 300 grt and over, and all tows over 45m in length.

All participating vessels should report to the VTS Control on VHF channel 18, as follows:

1. 30 minutes prior to entering the VTS area (voluntary for vessels equipped with AIS). Vessels must state their name, call sign, position, and destination.
2. On entering the VTS area or immediately prior to leaving a quay or anchorage. Vessels must state their name, call sign, position, intended route, destination, and draft.
3. On arrival at a quay, when changing route, when anchoring, on the occurrence of any defects which may affect the safety of navigation, or on leaving the area. Vessels must state their name, position, and destination.

The Varberg VTS Control provides information on traffic in the area and other navigational details, including ice conditions and passage limitations. The VTS Control, which is operated from Goteborg, can be contacted by e-mail, as follows:

info@terminalwest.se

All vessels within the VTS area must maintain a continuous listening watch on VHF channels 18 and 16.

Vessels in excess of 20 grt, 15m or more in length, and smaller registered fishing vessels should report if their voyage or activity may influence the safe maneuvering of other vessels.

Anchorage.—Small vessels can anchor, in cases of necessity, in depths of 6 to 9m, sand and clay, within the roadstead lying between Varberg and Skrivareklippan, the SE extremity of Getteron.

Caution.—During strong SW gales, vessels with a draft exceeding 6.4m should not attempt to enter the harbor.

6.20 The coast between Subbeberget Light and Morups Tange Light, 10.5 miles SSE, is low with some inland hills. In the vicinity of the latter light, it has a light color. The shore is fringed by numerous rocks and shoals which may best be seen on the chart.

Rodskar (57°04'N., 12°17'E.), an islet, lies close offshore, 1.5 miles S of Subbeberget Light, and is marked by a conspicuous beacon. A detached shoal patch, with a least depth of 5.5m, lies close W of this island and is marked by a buoy.

Bjorsgardsgrunden, a shoal area, lies centered about 1.2 miles S of Rodskar. It has depths of 4 to 8.7m and is marked by a buoy at the NW side.

Galten, a detached shoal patch, lies about 1.4 miles offshore, 3 miles SSE of Rodskar. It has a least depth of 7m and is marked close W by a buoy.

Sodra Bergsrevet, a detached shoal patch, lies about 2 miles offshore, 1.4 miles S of Galten, and has a least depth of 8.5m.

The above shoal patches form the outermost dangers along this stretch of coast.

6.21 **Morups Tange Light** (56°55'N., 12°22'E.), equipped with a racon, is shown from a prominent tower, 28m high, standing on a point of the same name. Shoal patches, with depths of less than 10m lie up to about 3.7 miles NNW, 3.1 miles NW, and 1.5 miles WNW of this light. Skorren, a detached shoal patch, lies 1.3 miles WSW of the light. It has a least depth of 10m and is marked by a buoy. The point is fringed by shoals, with depths of less than 5m, which extend up to about 1 mile seaward and may best be seen on the chart. A spit, with depths of less than 10m, extends up to about 2 miles S from the point.

Morups Tange Light

Glommen Light, shown from a structure on the head of the W breakwater, stands 0.5 mile NNW of Morups Tange Light.

Lilla Middelgrund (56°57'N., 11°56'E.), an extensive offlying shoal area, is centered about 15 miles W of Morups Tange Light. It has a least depth of 6.2m and is marked at the NE side by a lighted buoy.

Morups Bank (56°57'N., 12°13'E.), a detached shoal area, lies centered about 5.5 miles SW of Morups Tange Light. It has a least depth of 11m and is marked at the NW side by a lighted buoy.

Between Morups Tange Light and Falkenberg, 5 miles SSE, the coast is low and there are few outstanding features. The shore is fringed by foul ground and rocks.

A conspicuous church is situated at Tvaaker, 6 miles SE of Subbeberget Light. A prominent chimney stands near the shore at Murarelyckan, 3.1 miles ESE of Morups Tange Light.

Several small harbors are situated along the coast between Subbeberget Light and Falkenberg. These harbors have no commercial significance and are used only by small craft and fishing vessels. Local knowledge is required. The main harbors include the following;

1. Traslovslage (57°04'N., 12°17'E.).
2. Galtaback Hamn (57°02'N., 12°19'E.).
3. Glommen (56°56'N., 12°21'E.).

Falkenberg (56°54'N., 12°30'E.)

World Port Index No. 24040

6.22 Falkenberg stands at the mouth of the Atran River, 5 miles ESE of Morups Tange. The harbor extends about 1 mile

Varberg

above the entrance and is protected by two breakwaters, which project 0.5 mile seaward from the mouth of the river.

Falkenberg Home Page

http://www.falkenbergs-terminal.se

Ice.—The harbor is ice free except in severe winters when it may be closed during January and February. Winds from S and SE may cause ice accumulation in the harbor entrance.

Tides—Currents.—The tidal range is 0.3 to 0.7m.

At times, a current sets NW or SE across the entrance. This current may change direction several times a day and may attain a rate of 3 to 4 knots. When the current off the coast, setting NW or SE, encounters the outgoing current from the river, heavy seas may frequently be experienced in the approaches.

Depths—Limitations.—Detached shoals, with depths of less than 10m, lie up to about 2.2 miles W, 1.4 miles SW, and 1.2 miles S of the breakwater heads.

Knolagrund, a detached shoal bank, lies centered about 2 miles SSE of the breakwater heads. It has a least depth of 4m and is marked by a buoy.

From the vicinity of the Approach Lighted Buoy, an approach track leads NNE through the off-lying dangers. The entrance channel, 50m wide, leads NE between the breakwater heads and has a dredged depth of 7m.

Both sides of the river are quayed and provide about 1,400m of total berthage. The main quays include Magasinkajen, 290m long, and Silokajen, 222m long. These quays are located at the NW side of the river and have depths of 7m alongside.

Two fixed bridges, with vertical clearances of 5.3m, span the N end of the harbor. The harbor fairway has a dredged depth of 7m up to about 500m S of the bridges where it decreases to 5m.

There are facilities for general cargo, bulk, ro-ro, and fishing vessels. Vessels up to 160m in length and 6.5m draft can be accommodated.

There are two floating docks. The largest is 124m long and 22.7m wide. It has a depth of 5.1m over the blocks and can handle vessels up to 15,000 dwt.

Aspect.—A light is shown from a prominent floodlit tower, 8m high, standing on the head of the W breakwater. An Approach Lighted Buoy is moored about 1.9 miles SSW of this light.

Troingeberget, a prominent hill, rises 3 miles NE of the breakwater heads and is 60m high. A prominent church stands at Skrea, 3.5 miles E of the breakwater heads. A prominent wind generator is reported to stand near the shore about 0.8 mile N of the breakwater heads.

Pilotage.—Pilotage to Falkenberg is compulsory for the following vessels (see paragraph 6.1):

1. All Category 1 vessels.
2. Category 2 vessels of 80m in length, 15m beam, and 5m draft and over.
3. Category 3 vessels of 90m in length, 16m beam, and 5.5m draft and over.

Generally, initial ordering of pilots should be carried out via the Swedish Vessel Reporting System (FRS) on the Swedish Maritime Administration internet website (see paragraph 6.1). In exceptional cases, pilots (call: Falkenberg Pilot) may be ordered by telephone: 46-3-647772 or on VHF channel 18. A preliminary re-quest for pilotage should be made at least 24 hours in advance. A definitive pilotage request must be made via the Pilot Request System at least 5 hours in advance.

Pilots can be contacted by VHF and board in the vicinity of the Approach Lighted Buoy (56°51'N., 12°27'E.).

Regulations.—A Vessel Traffic Service (VTS) system operates in the approaches to the coast in the vicinity of Falkenberg. The VTS area limit is indicated by the arc of a circle with a

radius of 3 miles centered on the W breakwater light (56°53'N., 12°28'E.).

The VTS system is mandatory for all vessels of 45m in length and over, all vessels of 300 grt and over, and all tows over 45m in length.

All participating vessels should report to the VTS Control on VHF channel 18, as follows:

1. 30 minutes prior to entering the VTS area (voluntary for vessels equipped with AIS). Vessels must state their name, call sign, position, and destination.
2. On entering the VTS area or immediately prior to leaving a quay or anchorage. Vessels must state their name, call sign, position, intended route, destination, and draft.
3. On arrival at a quay, when changing route, when anchoring, on the occurrence of any defects which may affect the safety of navigation, or on leaving the area. Vessels must state their name, position, and destination.

The Falkenberg VTS Control provides information on traffic in the area and other navigational details, including ice conditions and passage limitations. The VTS Control, which is operated from Goteborg, can be contacted by e-mail, as follows:

westcoastvts@sjofartsverket.se

All vessels within the VTS area must maintain a continuous listening watch on VHF channels 16 and 12.

Vessels in excess of 20 grt, 15m or more in length, and smaller registered fishing vessels should report if their voyage or activity may influence the safe maneuvering of other vessels.

The port of Falkenberg may be contacted by e-mail, as follows:

Falkenberg Home Page

http://www.sjofartsverket.se

A speed limit of 5 knots is in force within the harbor.

Caution.—With winds from SW at Force 7 or above, lightly laden vessels should not attempt to enter the port.

A number of wrecks lie in the outer approaches to the port and may best be seen on the chart.

Bottom nets, marked by piles or buoys, may be encountered off the coast in the vicinity of the port.

A submarine power cable extends across the harbor about 0.2 mile inside the breakwaters.

6.23 The coast between Falkenburg and Tylo, 17 miles SE, is generally hilly. The shore is fringed by foul ground and shoals which extend up to 2 miles seaward in places. The shore of the bay lying close N of Tylo is formed by light-colored sand dunes and may easily be identified.

A prominent church stands 2.5 miles inland at Eftra, about 6 miles ESE of Falkenberg.

Tylo (56°39'N., 12°43'E.), an islet, lies close offshore and is marked by a prominent tower.

Tylogrund Light (56°38'N., 12°42'E.) is shown from a prominent tower, 23m high, standing on a shoal lying 0.7 mile SSW of Tylo. The shoal has a least depth of 1.5m and is marked by a buoy.

Wrecks, with a depth of 10m, lie about 2.7 miles and 4.7 miles WNW of Tylogrund Light.

Tylogrund Light

A conspicuous windmill is reported to stand at Sardals, 6.5 miles NNW of Tylogrund Light. A prominent church, with a black spire, and a water tower are reported to be situated at Sondrum, about 3.4 miles ENE of Tylogrund Light.

Laholmsbukten (56°34'N., 12°48'E.), a large bay, lies SE of Tylo; its E shore is low and light-colored. Halmstad is situated in the NE corner of this bay.

Hallandsasen, a range of hills, rises to a height of 226m and extends SE from the S side of the bay. Knosen, 152m high, rises 11 miles S of Tylo and forms the highest elevation in the NW part of this range. This part of the coast bears some resemblance to Kullen, the S entrance point of Skalderviken located 12 miles SW, and for this reason has sometimes been called Falska Kullen.

Anchorage is available, in depths of 14 to 18m, sand and clay, good holding ground, in most of Laholmsbukten, about 3 miles offshore.

Several small harbors are situated along the coast between Falkenberg and the S side of Laholmsbukten. These harbors have no commercial significance and are used only by small craft and fishing vessels. Local knowledge is required. The main harbors include the following:

1. Stensjo Hamn (56°47'N., 12°37'E.).
2. Skallkroken (56°44'N., 12°39'E.).
3. Grotvik (56°38.5'N., 12°46.7'E.).
4. Bastad (56°26'N., 12°51'E.).

Caution.—Tylo is a designated bird sanctuary. Vessels are prohibited from approaching within 1.5 miles of this islet.

A firing exercise area extends 6 miles seaward from the vicinity of Ringenas (56°41'N., 12°41'E.). Vessels are prohibited from remaining in the area while firing is taking place. When firing is in progress, a warning light is shown from a tower, 25m high, standing 2.3 miles NNW of Tylo.

A number of wrecks, some dangerous, lie off this stretch of coast and may best be seen on the chart.

Halmstad (56°40'N., 12°52'E.)

World Port Index No. 24050

6.24 Halmstad is situated along both banks of the Nissan

River in the NE part of Laholmsbukten and serves an industrial area.

Halmstad Home Page

http://www.halmstadharbour.se

Ice.—Ice seldom obstructs navigation except during the severest winters. When necessary, icebreakers are used to keep the harbor open.

Tides—Currents.—The maximum differences between mean water level and high and low water levels are 1.2m and 1m, respectively.

The river current is deflected to the W by the breakwater and sets across the harbor entrance.

Halmstad—East Dock

Halmstad—Nissan Dock

Depths—Limitations.—The entrance channel, with a dredged depth of 12m over a width of 90m, leads NE through the off-lying dangers into the harbor.

Ocean Harbor, a bulk terminal, is situated close inside the S breakwater. It provides 850m of berthage, with depths of 9 to 12m alongside. Oil Harbor is situated close NE of Ocean Harbor. It provides five berths with depths of 9 to 11m alongside. Import Quay, at the E side of the river, is 250m long and has depths of 6 to 7.5m alongside.

The port has about 2,200m of total quayage. There are facilities for general cargo, ro-ro, ferry, bulk, container, tanker, and fishing vessels. Cargo vessels up to 75,000 dwt, 235m in length, and 11m draft can be accommodated. Tankers up to 215m in length and 9.1m draft can be handled.

Aspect.—The entrance channel is marked by buoys and the limits of the fairway are indicated by lighted ranges. A light is shown from a floodlit framework tower, 10m high, standing on the head of the S breakwater. Fairway Lighted Buoy is moored about 3 miles SE of the S breakwater head.

A prominent church, with a pointed spire, stands on low land at Tronninge, about 3.7 miles SE of the S breakwater head.

Pilotage.—Pilotage to Halmstad is compulsory for the following vessels (see paragraph 6.1):

1. All Category 1 vessels.
2. Category 2 vessels of 80m in length, 15m beam, and 5m draft and over.
3. Category 3 vessels of 90m in length, 16m beam, and 5.5m draft and over.

Generally, initial ordering of pilots should be carried out via the Swedish Vessel Reporting System (FRS) on the Swedish Maritime Administration internet website (see paragraph 6.1). In exceptional cases, pilots (call: Halmstad Pilot) may be ordered by telephone or on VHF channel 62. A preliminary request for pilotage should be made at least 24 hours in advance. A definitive pilotage request must be made via the Pilot Request System at least 5 hours in advance.

Pilots can be contacted by VHF and board NE of the Fairway Lighted Buoy (56°37'N., 12°47'E.).

Regulations.—A Vessel Traffic Service (VTS) system operates in the approaches to the coast in the vicinity of Halmstad. The VTS area limit is indicated by the arc of a circle with a radius of 6 miles centered on the outer breakwater light (56°39'N., 12°50'E.).

The VTS system is mandatory for all vessels of 45m in length and over, all vessels of 300 grt and over, and all tows over 45m in length.

All participating vessels should report to the VTS Control on VHF channel 18, as follows:

1. 30 minutes prior to entering the VTS area (voluntary for vessels equipped with AIS). Vessels must state their name, call sign, position, and destination.
2. On entering the VTS area or immediately prior to leaving a quay or anchorage. Vessels must state their name, call sign, position, intended route, destination, and draft.
3. On arrival at a quay, when changing route, when anchoring, on the occurrence of any defects which may affect the safety of navigation, or on leaving the area. Vessels must state their name, position, and destination.

The Halmstad VTS Control provides information on traffic in the area and other navigational details, including ice conditions and passage limitations. The VTS Control, which is operated from Goteborg, can be contacted by e-mail, as follows:

westcoastvts@sjofartsverket.se

All vessels within the VTS area must maintain a continuous listening watch on VHF channels 18 and 16.

Vessels in excess of 20 grt, 15m or more in length, and smaller registered fishing vessels should report if their voyage or activity may influence the safe maneuvering of other vessels.

Anchorage.—Vessels can anchor, in a depth of 11m, sand over clay, within the roadstead lying between 0.5 mile and 1 mile SW of the outer breakwater, and clear of the entrance channel.

Caution.—Strong currents may be encountered off the harbor entrance.

With winds from SW at Force 7 or above, lightly-laden vessels should not attempt to enter the port.

6.25 Hallands Vadero (56°27'N., 12°34'E.), a low island, lies off the SW entrance point of Laholmsbukten, 13 miles SSW of Tylo. It is wooded and surrounded by foul ground. This island is not easily seen against the background of the mainland. A narrow channel lies between the foul ground surrounding the island and the shore bank fringing the coast.

Hallands Vadero Light (56°27.0'N., 12°32.6'E.) is shown from a prominent tower, 13m high, standing on the NW extremity of the island.

Hallands Vadero Light

Vingaskar, a small islet, lies on the foul ground fringing the SE side of the island, 2.3 miles SE of Hallands Vadero Light, and is marked by a light. Vrenen, a small islet, lies off the E extremity of the island, 1.8 miles ESE of Hallands Vadero Light, and is marked by a prominent beacon.

Anchorage is available, in depths of 12 to 15m, sand and clay, off the SE side of Hallands Vadero, close SE of Vrenen. Local knowledge is advised.

Skalderviken (56°18'N., 12°40'E.), a large bay, extends SE for about 10 miles. It is entered between the S side of Hallands Vadero and the W extremity of Kullen, 8.5 miles SSW. The NE and S sides of this bay are low but a range of hills stands on the SW side. This range is somewhat similar to the one standing on the S side of Laholmsbukten.

Bergstromsgrund, a detached shoal patch, lies about 2 miles offshore, 6.2 miles SE of Vingaskar Light. It has a least depth of 5.2m and is marked by a buoy. This shoal forms the outermost danger lying off the NE side of the bay.

The bottom of the bay is rocky near the NE and SW shores but it consists of sand and clay in the center. A preferred anchorage lies, in a depth of 14m, about 3 miles S of Bergstromsgrund, but this roadstead is exposed to NW winds.

A conspicuous wind generator is reported to stand on the mainland about 1.5 miles SE of Vingaskar Light.

Kullen Light

Ostra Hogkullen, 118m high, stands about 3 miles ESE of the W extremity of Kullen and is the tallest elevation in the area. Prominent churches are situated in the following towns:

1. Jonstorp (56°13.9'N., 12°40.3'E.).
2. Farhult (56°12.9'N., 12°42.7'E.).
3. Forslov (56°21.2'N., 12°49.2'E.).
4. Grevie (56°22.3'N., 12°47.5'E.).
5. Vastra Karup (56°24.8'N., 12°44.7'E.).

6.26 Kullen Light (56°18'N., 12°27'E.) is shown from a prominent tower, 15m high with an adjacent house, standing 0.2 mile SE of the NW extremity of the promontory. It has been reported that this light tower is sometimes obscured by low clouds.

Several small harbors are situated within Skalderviken and along the coast between Hallands Vadero and Kullen. These harbors have no commercial significance and are used only by small craft, pleasure boats, and fishing vessels. Local knowledge is required. The main harbors include the following:

1. Torekov Hamn (56°26'N., 12°37'E.).
2. Ramsjohamn (56°23'N., 12°40'E.).
3. Vejbystrand (56°19'N., 12°46'E.).
4. Magnarp (56°18'N., 12°47'E.).
5. Skalderviken Hamn (56°16'N., 12°50'E.).
6. Angelholm Hamn (56°16'N., 12°50'E.).
7. Svanshall (56°15'N., 12°40'E.).
8. Skaret (56°16'N., 12°37'E.).
9. Arild (56°16.5'N., 12°34.5'E.).

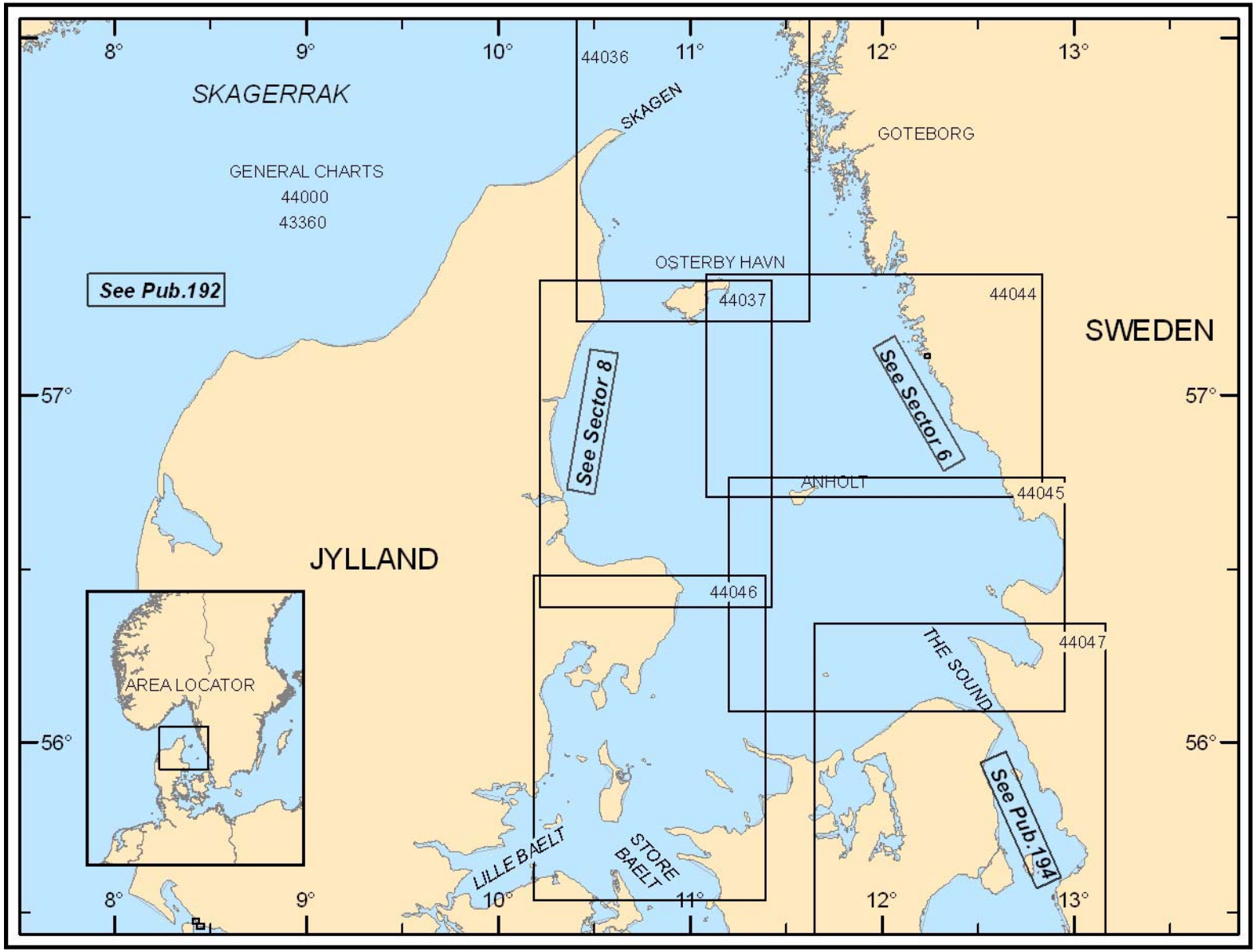
For details concerning the waters lying S of Kullen Light, see Pub. 194, Sailing Directions (Enroute) Baltic Sea (Southern Part).

Caution.—The islets surrounding Hallands Vadero are bird sanctuaries and an area lying off the SW shore is a seal reserve. Entry to and landing on these areas are prohibited.

A number of wrecks, some dangerous, lie off this stretch of coast and may best be seen on the chart.

Submarine power cables, which may best be seen on the chart, extend between Hallands Vadero and the mainland.

Numerous pleasure craft may be encountered within Skalderviken.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **7** — CHART INFORMATION

SECTOR 7

DENMARK—THE SKAGERRAK—SOUTH SIDE, THE KATTEGAT, AND SJAELLAND—NORTH COAST

Plan.—This sector describes the approach to the Kattegat, via the Skagerrak and the main passages through the central portion of the Kattegat. The arrangement of this sector is NE from Hanstholm to Skagen, the NE extremity of Jylland, then S through the Kattegat, describing the islands of Laeso, Anholt, and Hesselo and the two main channels passing W and E of them. This is followed by a description of the N coast of Sjaelland, at the S end of the Kattegat.

General Remarks

7.1 The Skagerrak, lying between the N coast of Denmark and the S coast of Norway, forms the entrance to the Baltic Sea from the North Sea. Its W limit extends between the Danish coast at Hanstholm (57°07'N., 8°36'E.) and the Norwegian coast at Lindesnes (57°59'N., 7°03'E.). The Kattegat is the sea area lying between the N part of Denmark and the W coast of Sweden.

The S side of the Skagerrak extending between Hanstholm and Skagen, about 77 miles ENE, is generally low and backed by sand dunes. However, there are several areas where steep cliffs face the coast. The coastal passage leads ENE across the entrances of Vigo Bugt, Jammerbugt, and Tannis Bugt, three adjacent bights that indent the shore.

Ice.—Ice starts forming in the Kattegat along the Swedish coast near Goteborg at the beginning of January. By the end of the month, ice of very low concentration can be found sporadically in the whole area. By the middle of February concentrations can reach 25 percent along the Swedish coast. At the beginning of April ice can only be found near the Danish and Swedish coasts. The area is normally ice free by the middle of the month (see paragraph 7.8).

Ice information reports and icebreaker service for the Baltic coast of Denmark are made available on request from the State Ice Service or from any icebreaker. The Danish icebreakers and their call letters are Danbjom (OUDN), Isbjom (OUDO), and Thorbjom (OUDP). These icebreakers can be contacted on 2,182 kHz, on VHF channel 16, or through Lyngby CRS.

The State Ice Service may be contacted by e-mail, as follows:

istjenesten@sok.dk

For further information concerning Danish ice-breaking services, see Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

Tides—Currents.—The currents between Hanstholm and Skagen, set in the direction of the coast, E or W according to the direction of the wind. More prevalent is the E current. In Jammerbugt and from Hirtshals to Skagen, the current generally sets E, with an average rate of 0.5 to 1.5 knots. Storms can increase this rate to 3 or 4 knots. The tidal range on this coast is about 0.3m in calm weather, with no tidal current.

Strong winds from between SW and NW may raise the water level by about 2.5m. Strong winds from NE and E may lower the level by as much as 1.1m.

Pilotage.—Pilotage is compulsory for following vesssels entering Danish internal and external waters and destined for a Danish port, reloading of cargo to and from another vessel (ship to ship transfer) in Danish territorial waters, or reqiuiring to anchor in Danish waters and apply to those:

1. Vessels carrying oil or having uncleaned and non-inerted cargo tanks.
2. Laden chemical tankers.
3. Gas tankers.
4. Vessels carrying radioactive cargo.
5. Vessels carrying more than 5,000 tons of bunkers.
6. Towed vessels:
   a. Vessels over 150 grt or over 28m in length being towed in dredged channels or marked navigational channels when entering or leaving harbor.
   b. Tugs shall use pilots when the towed ship is not manned or cannot be propelled by its engines.
   c. Tugs shall use pilots when the towed ship is not manned or cannot be propelled by its engines.
   d. Vessels towing or being towed within the same harbor area are exempt from pilotage.

DanPilot Main Administration.—This center may be contacted, as follows:

1. Telephone 45-63-256600
2. E-mail: account@danpilot.dk

Engaging the Harbor Pilots or Deep Sea (Transit) Pilots may be requested directly from the State Pilot Service or from a private pilot enterprise. Pilot arrangements are accepted via the following centers:

1. DanPilot Requesting Center (call sign: Limfjorden Pilot)
   a. VHF: VHF channel 9, 12, 13, and 16
   b. Telephone: 45-63-256670
   c. Facsimile: 45-98-251477
   d. E-mail: limfjorden@danpilot.dk
   e. website: http://www.danpilot.dk

   The center arranges pilotage for Hanstholm, Skagen, Nykobing, Hundested, Frederiksvaerk, and Frederikssund.
2. DanPilot (call sign: Great Belt Pilot)
   a. VHF: VHF channel 12, 13, 14, and 16
   b. Telephone: 45-63-256666
   c. Facsimile: 45-63-501528
   d. E-mail: danpilot@danpilot.dk

3. DanPilot (call sign: Little Belt)
   a. VHF: VHF channel 16
   b. Telephone: 45-76-200320
   c. Facsimile: 45-75-928822
   d. E-mail: littlebelt-pilot@lillebaelt.dk

Pilots for certain other Danish ports are not provided by DanPilot but may be ordered using the above procedures. These ports include Arhus, Aeroskobing, Bogense, Ebeltoft, Egernsund, Fredrikshavn, Grasten, Haderslev Fjord, Hanstholm, Hirstshals, Hvide Sande, Kerteminde, Marstal, Nexo (Bornholm), Nysted, Rodbyhavn, Romo Havn, Ronne (Bornholm), Saeby, Soby, Sonderborg, and Thorsminde.

Deep Sea (Transit) Pilots board vessels at the following positions:

1. Via Route T (see paragraph 7.8).
   a. Position 57°47.0'N, 10°38.0'E or position 57°44.0'N, 10°45.0'E (Skagen/The Scaw).
   b. Position 56°24.0'N, 11°05.0'E (Grenaa).
   c. Position 55°23.5'N, 11°00.0'E (Sprogo NE).
   d. Position 54°46.0'N, 10°49.0'E or position 54°47.5'N, 10°52.5'E (Store Belt/Great Belt).
   e. Position 54°37.0'N, 12°16.0'E (Gedser).
   f. Position 55°20.0'N, 14°47.0'E (Bornholm).
2. Via The Sound.
   a. Position 57°47.0'N, 10°38.0'E or 57°44.0'N, 10°45.0'E (Skagen/The Scaw).
   b. Position 56°07.5'N, 12°31.0'E (Helsingor).
   c. Position 55°45.0'N, 12°41.0'E (Kobenhavn).
   d. Position 55°31.0'N, 12°43.0'E (Drogden).
   e. Position 55°20.0'N, 14°47.0'E (Bornholm).

An IMO Resolution recommends that vessels with a draft of 11m or more and all vessels, irrespective of size, carrying a shipment of radiated nuclear fuel, plutonium, or highly radioactive waste use the services of a pilot when transiting Route T.

Vessels on non-stop transit pilotage (Bornholm to Skagen and vice-versa) with a draft of more than 11m should employ two pilots.

For additional information concerning pilotage in Danish waters, see the following Internet site:

Danish Pilotage Service Home Page
http://www.pilotage.dk

Regulations.—SOUNDREP, a voluntary ship reporting system for vessels of 300 grt abd over, has been established between Denmark and Sweden in the central and southern parts of The Sound in order to improve safety and protect the marine environment. This reporting system, which is operated by Sound VTS, includes a Reporting Area and an inner Operational Area. The system applies to all vessels in Danish waters in the Baltic Sea, including the transit routes. For further information, see Sector 1 in Pub. 194, Sailing Directions (Enroute) Baltic Sea (Southern Part).

Recommendations for navigating through the entrances to the Baltic Sea and along Route T have been issued by the IMO. For further information concerning these IMO Resolutions, see paragraph 7.8.

It is reported that the Baltic Sea has been designated a Sulphur Emission Control Area and regulations concerning the sulphur content of fuel used by vessels apply. For further information, see MARPOL 73/78 Annex VI regulations.

BELTREP, a mandatory ship reporting system, is operated by Great Belt (Store Baelt) VTS in the N and central parts of Store Baelt (call sign: Great Belt VTS).

The N limit of the VTS area is bounded by a line joining the following positions:

a. 56°00.0'N, 11°17.0'E (Sjaellands Odde).
b. 56°00.0'N, 10°56.0'E (near Marthe Flak).
c. 55°47.0'N, 10°38.0'E (Samso).
d. 55°36.0'N, 10°38.0'E (Fyn).

This VTS system must be used by all vessels of 50 grt and over and all vessels with an air draft of 15m and over. For further information concerning BELTREP, see Sector 2 in Pub. 194, Sailing Directions (Enroute) Baltic Sea (Southern Part).

Directions.—For information concerning the main routes in the Kattegat, see paragraph 7.8.

Caution.—Vessels entering the Skagerrak infrequently or constrained by draft should employ a deep sea pilot.

Several submarine cables, which may best be seen on the chart, extend seaward from the stretch of coast between Hanstholm and Skagen. Some of these cables carry direct current and may cause deflections of the magnetic compass.

Numerous wrecks, some buoyed, lie up to 20 miles offshore along the S side of the Skagerrak and may best be seen on the chart.

Several areas, within which buried mines or aircraft wreckage may exist, lie within the Skagerrak and may best be seen on the chart. Anchoring, fishing, or any other seabed activities are prohibited in these areas.

The entrance channels and harbors located on the S side of the Skagerrak are affected by loose sand, which is swept along the coast by gales, and are subject to silting.

Hanstholm to Skagen

7.2 Hanstholm (57°07'N., 8°36'E.), the NW extremity of Denmark, is formed by a promontory consisting of chalk and limestone, which rises abruptly from the sea. A light is shown from a prominent tower, 23m high, standing on the NW part of the promontory. Hjertebjerg, the summit of the promontory, is 67m high and rises about 2 miles SE of the light.

Hanstholm Light

Shoal patches, with depths of 10m and 11m, lie about 3 miles WNW and 4 miles NE, respectively of the light.

7.3 Hanstholm Havn (57°08'N., 8°36'E.) (World Port Index No. 30455), a small commercial port, is entered about 1

mile NNW of Hanstholm Light. In addition to being a ferry terminal, the harbor, which is enclosed by two curved breakwaters, provides facilities for offshore oil and gas support vessels, fishing vessels, and general cargo vessels.

Tides—Currents.—The mean tidal range is 0.3m. The water level may be increased by up to about 1.3m during strong W winds and reduced by as much as about 1.5m during strong E winds. The harbor is reported to be ice-free all year.

Off the harbor, winds from between S and W cause an E current and winds from between N and E cause a W current. The rate of these currents sometimes exceeds 2 knots.

Depths—Limitations.—The entrance channel is dredged to a depth of 9m on the range line; the outer part of the harbor has a dredged depth of 8.5m.

The harbor provides eight quayed basins. Basin No. 4, Basin No. 5, Basin No. 6, Basin No. 7, and Basin No. 8 have depths of 3.9 to 5.9m and are used only by fishing vessels.

Basin No. 1, Basin No. 2, and Basin No. 3 provide nine berths, 30 to 221m long, with depths of 7 to 7.5m alongside, which are used mostly by commercial vessels. A ferry terminal and ro-ro ramp are located in Basin No. 2.

The size of the largest vessel that can be accommodated depends upon wind, current, sea conditions, and the water level at the time of entry. Under favorable conditions, the harbor can accommodate vessels up to 135m in length, 35m beam, and 7.5m draft.

Hanstholm Harbor

Aspect.—The entrance channel is indicated by a lighted range. Fairway Lighted Buoy is moored about 0.6 mile NW of the harbor entrance.

Pilotage.—Pilotage is compulsory for vessels of 50m in length and over. Exemptions may be made for frequent visitors. Pilots can be contacted by VHF and board in the vicinity of Fairway Lighted Buoy. For further information, see Pilotage in paragraph 7.1.

Regulations.—Inbound vessels have precedence over outbound vessels.

A speed limit of 3 knots is in force inside the inner moles.

Hanstholm Havn may be contacted by e-mail, as follows:

info@portofhanstholm.dk

Caution.—Depths in the entrance channel and the outer part of the harbor may be reduced by silting, especially after gales.

It is reported that the head of the E breakwater is sometimes awash and difficult to distinguish.

7.4 Vigso Bugt (57°09'N., 9°00'E.) extends 13 miles E between Hanstholm and Bulbjerg. Prominent landmarks located along the shore of the bay include Vigo Beacon (57°06'N., 8°45'E.), Hjardemal Church (57°03'N., 8°48'E.), and Lild Church (57°06'N., 9°00'E.).

The bay is fringed by two sand ridges and sometimes a third ridge forms in the W part. Off Sandnaeshage, 2 miles W of Bulbjerg, there are no sand ridges and the bottom is composed of medium-sized stones.

Roshage Mole (57°08'N., 8°37'E.), a breakwater, extends N from the shore, about 1 mile ENE of Hanstholm. It protects a beach landing place for boats. This breakwater is 310m long and 2.2m high at its outer end. It stands in a depth of 3.5m and is marked by a light. There is no landing place on the breakwater and it should be given a wide berth.

Bulbjerg (57°10'N., 9°02'E.), 47m high, is a whitish yellow cliff consisting of chalk and limestone. It has a steep face and is the termination of a hilly ridge which extends about 3 miles inland. This cliff is very conspicuous from seaward.

Skarreklit (57°10'N., 9°02'E.), a vertical limestone rock, is 15m high and lies close N of Bulbjerg.

Bragerne (57°10'N., 8°56'E.), a detached rocky shoal, lies 3 miles W of Skarreklit and about 2 miles offshore. This shoal has a least depth of 0.3m and is marked by a lighted buoy. A narrow channel, with depths of 7 to 9m, lies between the S side of this shoal and the shore.

7.5 Jammerbugt (57°12'N., 9°10'E.) extends about 40 miles NE from Bulbjerg to Hirtshals. The shore of the bay between Bulbjerg and Svinklov, about 10 miles E, consists of low dunes, which increase to a height of 30m farther inland near Klim Bjerg.

Svinklov is a prominent chalk and limestone ridge covered with vegetation. A conspicuous white chalk cliff appears at its NW corner.

Other landmarks located along the shore of the bay include a conspicuous beacon at Lokken (57°23'N., 9°43'E.) and the prominent churches at Lokken and Borglum Kloster, 3 miles ESE.

A light is shown from a tube mast standing at the head of a breakwater, which extends about 180m NW from the shore at Lokken.

Rubjerg Knude, a prominent hill, stands about 4.5 miles NNE of Lokken and consists of sand and clay. It is the highest hill in the vicinity and drops to the sea in a steep cliff.

The hills on both sides of Lonstrup (57°28'N., 9°48'E.), located about 6 miles NNE of Lokken, also consist of sand and clay with steep cliffs.

Bakken and Lonstrup Rodgrund, two detached shoals with depths of 6.6m, lie about 5 miles and 3 miles, respectively, W of Lonstrup.

Hirtshals (57°35'N., 9°57'E.), a point, is located 8.5 miles NNE of Lonstrup. The coast is hilly in the vicinity of this point. Depths of less than 10m lie up to about 2 miles W and NW of the point.

A light is shown from a prominent tower, 35m high, standing on the SW side of the point.

Caution.—A firing practice area fronts Tranum Strand (57°10'N., 9°25'E.) and is marked by beacons and buoys.

7.6 Hirtshals Havn (57°36'N., 9°58'E.) (World Port Index No. 30450), located on the NE side of Hirtshals, is enclosed by two moles. It is protected by a breakwater, which extends about 0.2 mile NNW from the head of the W mole. This small commercial harbor is used mainly by ro-ro passenger ferries and fishing vessels.

Tides—Currents.—The tidal range is about 0.3m. Storms from W may raise the water level by up to 1.5m; storms from E may lower the water level by as much as 1m. The current usually sets E across the harbor entrance; however, winds from NNE and S cause the current to set W. The rate occasionally exceeds 5 knots.

Depths—Limitations.—The entrance channel has a dredged depth of 8m. The harbor consists of eight quayed basins. It provides about 1,800m of berthage, with depths of 3.7 to 7.5m alongside. Vessels up to 150m in length, 25m beam, and 7.5m draft can be accommodated in favorable conditions.

It is reported that a container quay, 300m long, has been constructed in the vicinty of the breakwater.

Aspect.—A lighted range indicates the entrance channel.

Pilotage.—Pilotage is not compulsory but is recommended for vessels without local knowledge. For further information, see Pilotage in paragraph 7.1.

Regulations.—Inbound vessels have precedence over outbound vessels.

Hirtshals Havn may be contacted by e-mail, as follows:

hirtshalshavn@hirtshalshavn.dk

Caution.—The entrance channel and harbor basins are subject to silting, particularly after storms, and depths may be less than charted. Vessels intending to enter should first obtain the latest information concerning the depths.

Hirtshals Light

7.7 The coast between Hirtshals and Skagen is fronted by Tannis Bugt. This stretch of coast, about 22 miles long, is backed by low sand dunes that increase in height as they extend across the peninsula to the shore of the Kattegat.

Skagen (57°44'N., 10°37'E.), also known as The Skaw, forms the NE extremity of Jylland. The land is this vicinity is flat and consists of hard sand backed by low sand hills. Grenen, the E extremity of Skagen, is a low and sandy point.

Skagens Rev (57°44'N., 10°41'E.), a spit, extends about 2 miles ENE from Grenen. It consists of hard white sand and is marked by lighted buoys. During gales, the sea breaks along the entire spit. By day, the edge of the spit may be identified by the discoloration of the water.

During E gales in winter, ice piles up on the shallowest part of Skagens Rev and sometimes remains there for a long time after the rest of the ice has disappeared.

Skagen Light (57°44'N., 10°38'E.), equipped with a racon, is shown from a prominent round tower, 46m high, standing near the S shore of Skagen, 1 mile SW of Grenen.

Skagen West Light (57°45'N., 10°36'E.) is shown from a prominent tower, 25m high, standing near the N shore of Skagen, 1.7 miles WNW of Grenen.

Skagen Light

Skagen West Light

A prominent disused light tower is situated 1.4 miles WSW of Skagen West Light. Gammel Skagen Beacon, a pyramidal framework structure, stands 2.7 miles SW of Skagen West Light.

A conspicuous television mast, 215m high, stands about 6 miles inland, 17 miles SW of Skagen Light, and is equipped with two aeronautical lights.

The town and harbor of Skagen Havn, situated 1.2 miles SW of Skagen Light, are described in paragraph 8.3.

Caution.—Vessels are warned against passing close to the buoys marking the extremity of Skagens Rev due to the strong current which frequently sweeps round the spit.

View S from Skagen Light

View N from Skagen Light

The Kattegat—Central Islands and Main Passages

7.8 The Kattegat is the sea area bordered at the E side by a section of the W coast of Sweden extending between Pater Noster Skaren (58°03'N., 11°20'E.) and Kullen Light (56°18'N., 12°27'E.). Its W side is bordered by a section of the E coast of Denmark extending between Skagen and Bjornsknude (55°42'N., 10°02'E.). The S end of the Kattegat is bordered by the N coasts of Sjaelland and Fyn.

The central part of the Kattegat is occupied by the Danish islands of Laeso, Anholt, and Hesselo. These islands are surrounded by banks, shoals, and reefs which extend considerable distances to seaward in some places.

The central islands, banks, and shoals divide the Kattegat into two main channels. The E channel, which is most commonly used, is deeper than the W channel and is less encumbered with dangers.

In winter, when the lighted buoys may be off station, it is not advisable for vessels with drafts of more than 5.5m to use the W channel because of the shoals lying S of Laeso Rende (57°13'N., 10°40'E.).

The bottom of the Kattegat consists mostly of fine or coarse yellowish sand. Gravel, usually of a reddish-brown color, is found in places, especially in the E part. Stones of various sizes are found throughout the Kattegat, except in the deeper parts, where the bottom is mainly clay covered with mud.

Ice.—The Kattegat and the passages leading S to the Baltic Sea lie close to the boundary between the mild winters of the NW Atlantic and the cold winters of N Europe. During some winters, mild W weather prevails and the entire area remains ice free. During other winters, cold E weather dominates the area and ice, sufficiently thick to restrict navigation for several weeks, is formed.

The ice encountered in the W part of the Baltic Sea is either pack ice, which drifts in the open sea, or fast ice, which borders the coast. Icebergs do not occur in this region.

Generally, the ice season begins in January and ends in March, with the majority of ice occurring in February. Due to the differing salinity in the area, the first ice usually forms within, and S of, Store Baelt (Great Belt), Lille Belt (Little Belt), and The Sound before forming in the Kattegat. However, in recent years, it was observed that thin ice formed earlier in the Kattegat than in the passages to the S. This was particularly true with NE and E winds, which cause colder weather on the Swedish coast than farther offshore.

When the formation of ice, in combination with drift ice from the Baltic Sea, fills the greater part of the Kattegat, navigation is impossible without the assistance of an icebreaker.

Pilotage.—For information concerning Deep Sea (Transit) Pilot boarding positions, see Pilotage in paragraph 7.1.

Deep Sea Pilots are available at the Skagen (Skaw Pilot) boarding position. They can be contacted by VHF and board in positions located about 3 miles N (Skagen 1) and 4 miles E (Skagen 2) of Skagens Light (57°44'N., 10°37'E.).

Directions.—Approximate distances from the vicinity of Skagen to Longitude 13°30'E in the SW approaches to the Baltic Sea, through the following passages:

1. Via Store Baelt—310 miles.
2. Via Lille Bae1t —340 miles.
3. Via The Sound—210 miles.

The natural links from the North Sea, through the Kattegat, to the Baltic Sea are Store Baelt (Great Belt), Lille Belt (Little Belt), and The Sound. However, the Nord-Ostee-Kanal (Kiel Kanel) provides the shortest link between the North Sea and the Baltic Sea.

Lille Belt, the W route, leads between the E coast of Jylland and the island of Fyn. The fairway channel is narrow and winding in places. It is about 67 miles long and has a controlling depth of 11m.

Store Baelt, the middle route, is used by larger deep-draft vessels. The fairway channel leads between the islands of Fyn and Sjaelland. It is about 63 miles long. The maximum depth obtainable via Route T is 17m, and the depth is permanently reduced in some area due to sand migration. In addition, variation sea level caused by tideand meteorological conditionstogether with unknown obstructionson the sea bottom and the sand migration, the depth of water may

decrease up to 2m. Therefore, it is recommended that vessels should not enter the area without sufficient under-keel clearance, taking into consideration the draft increasing factors, such as squat and effect of a course alteration.

The Sound, the E route, leads between the W coast of Sweden and Sjaelland. The fairway channel forms the shortest route to the Baltic Sea. It is about 65 miles long and has a controlling depth of 7.7m.

The above routes are described in detail within Pub. 194, Sailing Directions (Enroute) Baltic Sea (Southern Part).

Several designated through routes are situated within the Kaggegat. Route T, the main track, is well marked by navigation aids and is recommended for large vessels. This route leads from the vicinity of Skagens Rev through Store Baelt to a position located about 25 miles W of Kap Arkona (54°41'N., 13°26'E.). Sections of this track are designated as Deep Water Routes.

Route T.—From a position located about 5 miles NE of Skagens Light (57°44'N., 10°37'E.), Route T, the main track, leads about 30 miles SE to No. 3 Lighted Buoy (57°28'N., 11°25'E.), which is equipped with a racon. It continues SSE for 45 miles to No. 6 Lighted Buoy (56°45'N., 11°53'E.), which is moored off the E side of Anholt and equipped with a racon.

The track then leads SSW for 52 miles. It crosses Route B and passes about 1.5 miles NW of Sjaellands Rev N Light (56°06'N., 11°12'E.), which is equipped with a racon. Route A joins this track, about 6 miles SSW of the light, in the vicinity of No. 13 Lighted Buoy (56°01'N., 11°05'E.). Route T then continues SW and forms the principal track for large vessels passing through the Samso Baelt and entering the N part of Store Baelt (Great Belt).

Route T divides in the vicinity of No. 16 Lighted Buoy (55°55'N., 10°57'E.), which is equipped with a racon.

An IMO-adopted Traffic Separation Scheme (TSS), which may best be seen on the chart, leads 7.5 miles SW from No. 16 Lighted Buoy to No. 20 Lighted Buoy (55°49'N., 10°49'E.). An inshore traffic zone lies E and SE of this TSS.

The traffic lanes of the TSS are 800m wide. They have a least depth of 15m and must be used by vessels with a draft of 13m or less.

A designated Deep Water Route, which may best be seen on the chart, leads 5 miles WSW and then 3.5 miles S from No. 16 Lighted Buoy to No. 20 Lighted Buoy. This route, which passes between the S side of Hatter Rev shoal and the N side of Hatter Barn shoal, has a least depth of 19m.

This section of Route T, which has been designated a Deep Water Route, must be avoided by vessels capable, because of their draft, of navigating outside the route.

From No. 20 Lighted Buoy, Route T continues S for 4.5 miles into Store Baelt and passes about 1.3 miles W of Rosnaes Puller Light (55°45'N., 10°51'E.).

Route T is available for vessels with drafts up to 17m. However, charted depths may be reduced by as much as 2m due to unknown and moving obstructions. The depths along the track may also be reduced by meteorological conditions. Vessels are advised to contact the local authorities prior to transit for the latest information.

Route B.—From a position located about 5 miles NE of Skagens Light (57°44'N., 10°37'E.), Route B leads S for 32 miles, passing W of Laeso, and SSE for 18 miles to No. 6 Lighted Buoy (56°58'N., 10°52'E.). It continues SSW for 7 miles to No. B7 Lighted Buoy (56°51'N., 10°48'E.).

The track then leads 56 miles SE to No. 10 Lighted Buoy (56°18'N., 12°04'E.). It passes SW of Anholt and crosses Routes E, A, and T. From No. 10 Lighted Buoy, Route B leads SE for 18 miles and enters The Sound.

Route D.—From No. 6 Lighted Buoy (56°45'N., 11°53'E.), equipped with a racon, Route D leads SSE for 29 miles and joins Route B at No. 10 Lighted Buoy (56°18'N., 12°04'E.).

Route A.—From No. 6 Lighted Buoy (56°45'N., 11°53'E.), equipped with a racon, Route A leads 34 miles SE to No. 4 Lighted Buoy (56°24'N., 11°06'E.). It passes SE of Anholt and crosses Route B.

From No. 4 Lighted Buoy, the track leads 23 miles S and joins Route T at No. 13 Lighted Buoy (56°01'N., 11°05'E.).

Route F.—Route F leads 7 miles SW from No. B7 Lighted Buoy (56°51'N., 10°48'E.) to No. 2 Lighted Buoy (56°41'N., 10°38'E.). It then leads 13 miles SE and SSE to join Route A at No. 4 Lighted Buoy (56°24'N., 11°06'E.). This route leads across the Tangen flat and has a controlling depth of only 5m.

Route C.—From No. B7 Lighted Buoy (56°51'N., 10°48'E.), Route C leads 33 miles E from Route B to join Route T at No. 5 Lighted Buoy (56°51'N., 11°49'E.).

Route E.—From No. B7 Lighted Buoy (56°51'N., 10°48'E.), Route E leads 13 miles E from Route B (along Route C) to No. 3 Lighted Buoy (56°51'N., 11°12'E.). It then leads 27 miles SSW to join Route A at No. 4 Lighted Buoy (56°24'N., 11°06'E.). The track passes W of Anholt and crosses Route B.

All of the above routes and navigational aids may best be seen on the chart. For continuation of these routes, see Pub. 194, Sailing Directions (Enroute) Baltic Sea (Southern Part).

Regulations.—Extracts from IMO Resolutions concerning recommendations for navigating through the entrances to the Baltic Sea are stated below.

The recommendations for transiting Route T are, as follows:

1. Ships over 40,000 dwt, when passing through the entrances to the Baltic Sea, in view of the fact that 17m is the maximum obtainable depth without dredging in the area NE of Gedser and that the charted depths, even under normal conditions, may be decreased by as much as 2m due to unknown and moving obstructions, should:
   a. Not pass the area unless they have a draft with which it is safe to navigate through the area, taking into account the possibility of depths being as much as 2m less than charted, as mentioned above, and additionally taking into account the possible changes in the indicated depth of water caused by meteorological or other effects.
   b. Participate in BELTREP, the ship reporting system operated by governments of Denmark and Sweden.
   c. Exhibit the signal prescribed in Rule 28 of the International Regulations for Preventing Collisions at Sea (72 COLREGS) in certain areas of Store Baelt (Hatter Rev, Vengeancegrund, and in the narrow route E of Langeland), when constrained by draft.
2. Ships with a draft of 11m or more should, furthermore:
   a. Use for the passage the pilotage services locally established by the coastal States.
   b. Be aware that anchoring may be necessary due to weather and sea conditions in relation to the size and draft

of the ship and the sea level and, in this respect, take special account of the information available from the pilot and from radio navigation information services in the area.

3. Ships, irrespective of size and draft, carrying a shipment of irradiated Nuclear Fuel, Plutonium, and High Level Radioactive Wastes (INF cargo) should:

a. Participate in BELTREP, the ship reporting system operated by governments of Denmark and Sweden.

b. Use for the passage the pilotage services locally established by the coastal States.

4. Shipowners and Masters should consider the full potential of the new and improved navigation equipment introduced in the revised SOLAS chapter V, including Electronic Chart Display and Information System (ECDIS), when navigating in these narrow waters.

The recommendations for transiting The Sound are, as follows:

1. Loaded oil tankers with a draft of 7m or more, loaded chemical tankers and gas tankers, irrespective of size, and ships carrying a shipment of irradiated Nuclear Fuel, Plutonium, and High Level Radioactive Wastes (INF cargo), when navigating The Sound between a line connecting Svinbaaden Light and Hornbaek Harbour and a line connecting Skanor Harbour and Aflandshage (the S extremity of Amager Island) should:

a. Use for the passage the pilotage services locally established by the coastal States.

b. Be aware that anchoring may be necessary due to weather and sea conditions in relation to the size and draft of the ship and the sea level and, in this respect, take special account of the information available from the pilot and from radio navigation information services in the area.

2. Shipowners and Masters should consider the full potential of the new and improved navigation equipment introduced in the revised SOLAS chapter V, including Electronic Chart Display and Information System (ECDIS), when navigating in these narrow waters.

For further information concerning BELTREP, see Sector 2 in Pub. 194, Sailing Directions (Enroute) Baltic Sea (Southern Part).

Caution.—Several mine danger areas, which may best be seen on the chart, lie within the Kattegat. Anchoring, fishing, and any other seabed activities are prohibited in these areas. The risks to surface navigation in the areas are considered to be no more than the normal marine hazard.

Several submarine cables, which may best be seen on the chart, extend across the Kattegat, between Denmark and Sweden.

Several passenger ferries frequently cross the Kattegat. They run between Goteborg and Frederikshavn, Varberg and Grenaa, and Halmstad and Arhus. High-speed ferries operating between the mainland and Sjaelland may be encountered in the vicinity of Sjaellands Rev N Light (56°06'N., 11°12'E.).

7.9 Laeso (57°17'N., 11°00'E.), with its W end situated about 11 miles off the coast of Denmark, is the northernmost and largest of the islands lying in the Kattegat. This island presents a prominent obstruction because it is low and surrounded on all sides by projecting reefs and shoals.

Laeso is devoid of trees and its N side, with a ridge of sand dunes, is the highest part. Hojsande (57°18'N., 11°02'E.), the tallest hill, rises in the middle of the N side and is 24m high.

Laeso NW Rev (57°17'N., 10°47'E.), a sandy bank with depths of less than 2m, extends about 4 miles WNW from the W extremity of Laeso. It outermost edge is steep-to. A lighted buoy is moored close off the W side of the bank and marks the wreckage of a former light structure.

Byrum Church stands 4 miles E of the W extremity of the island. It has a prominent steeple, 30m high.

Vestero Havn (57°18'N., 10°55'E.), a small fishing and ferry harbor, is situated on the NW side of the island and is protected by two breakwaters. The entrance channel is dredged to a least depth of 3.5m. It leads SE and is indicated by a lighted range. Vessels up to 50m in length, 12m beam, and 3.4m draft can be accommodated. Local knowledge is required. A prominent church, with a red steeple, is situated in the town close S of the harbor.

Nordre Ronner (57°21'N., 10°55'E.), lying about 3.8 miles N of Vestero Havn, consists of a group of four grass-covered islets, 2 to 3m high. A light is shown from a prominent tower, 18m high, standing on the W side of the group.

Nordre Ronner Light

Ronnerev, a shallow spit, extends SSE from the vicinity of the light to the N shore of the island. Borfeld, a reef which dries at its N end, lies centered about 1 mile SW of the light. Detached shoal patches, with depths of less than 1m, lie up to 1.2 miles W and 1 mile NNE of the light and are marked by buoys.

7.10 Syrodde Light (57°19'N., 11°12'E.) is shown from a framework tower, 9m high, standing on a point of the same name, which forms the E extremity of the island. A beacon is situated 0.5 mile S of the light.

Danzigmand, a prominent dune, is 12m high and rises close W of Syrodde. Jegenshoj, another dune, is situated a little farther W. It is 9m high and can be easily recognized by a deep cleft in the middle.

A conspicuous radio mast, 160m high, stands on the SE part of the island, about 5.5 miles SW of Syrodde Light.

Osterby Havn (57°19'N., 11°08'E.), a small fishing and yachting harbor, lies about 2 miles W of Syrodde Light. It is protected by a curved breakwater and a mole. The entrance is 35m wide and has a depth of 3.5m. Vessels up to 50m in

Syrodde Light

length, 12m beam, and 3.4m draft can be accommodated. Local knowledge is advised.

Foul ground and shoals, with depths of less than 1m, extend up to about 0.8 mile from the shore, 0.6 mile E of the harbor entrance.

7.11 Laeso Trindel (57°26'N., 11°15'E.) lies about 6.7 miles NNE of Syrodde Light and is marked close E by a lighted buoy. This steep-to rocky patch has a least depth of 3.8m and is one of the most dangerous shoals in the Kattegat.

Laeso NE Flak, with depths of less than 10m, extends NNE for about 4 miles from Syrodde Light. The NE extremity of this bank is steep-to and is marked by a lighted buoy. Strong currents have been experienced in this vicinity.

The 20m curve, lying 8 to 10 miles seaward, forms the N side of a large bank which fronts the N side of Laeso.

No. 3 Lighted Buoy (57°28'N., 11°25'E), equipped with a racon, is moored about 6 miles ENE of Laeso Trindel and marks Route T.

Small vessels can anchor, clear of the dangers and submarine cables, in depths of 4 to 7m, sand and stones, off the N coast of Laeso. The roadstead provides excellent shelter from all winds except those from N.

The S side of Laeso is fronted by a large and nearly drying sandy flat, which extends about 3.5 miles S from the island. Hornfiskron, a small and sandy island, lies on this flat close off the S extremity of the island. Sondre Ronner, lying on the SW edge of the flat, consists of several rocks, one of which is always awash. A group of rocks, with depths of less than 2m, lies about 2 miles farther SW.

An extensive shoal area, with depths of less than 6m, extends about 14 miles S and SSE from the S edge of the sandy flat and may best be seen on the chart.

Kobbergrund, consisting of a number of small sand banks with depths of 2 to 3m, lies at the E side of this area. It is marked by a lighted buoy, moored about 12.7 miles SSE of Syrodde Light, and is one of the most dangerous shoals in the Kattegat.

A shoal area, with depths of less than 10m, extends about 5 miles farther S and SSE and may best be seen on the chart.

A prominent meteorological survey mast, 60m high, was reported (1999) to stand about 14 miles S of Syrodde Light.

Sandon, an extensive bank with depths of less than 20m, extends between the flats fronting the S side of Laeso and the flats fronting the N side of Anholt. Groves Flak, a large bank with depths of 13 to 24m, lies centered 16 miles SE of Syrodde Light at the E side of Sandon. A narrow deep, with depths up to 95m, separates the two banks. It was reported that a survey station marked by buoys is moored on the N part of Groves Flak.

Caution.—Large vessels and those not intending to anchor off Laeso should not approach the N coast of the island within depths of less than 20m, when the weather is bad.

A danger area, with a radius of 150m, lies centered about 0.7 mile NW of Osterby Havn and may best be seen on the chart. Anchoring and fishing are prohibited within this area due to the presence of mines.

Local knowledge is required to anchor on the sheltered shoal areas lying S of Laeso.

7.12 Anholt (56°43'N., 11°34'E.) lies about 35 miles SSE of Laeso and is also fronted by dangerous shallows. The E part of the island consists of low sand dunes. The W part rises from a narrow sandy foreshore to sandhills that reach heights of over 30m. The island is devoid of trees.

Nordberg, 39m high, stands on the NW extremity of the island; Sonderbjerg, 48m high, rises on the SW extremity of the island. Ostebakke, 24m high, is situated about 2 miles NNE of Sonderbjerg. These three sand hills are conspicuous from seaward.

Anholt Light (56°44'N., 11°39'E.) is shown from a prominent round tower, 42m high, standing on the E end of the island.

Anholt Light

Anholt Osterrev, a narrow and shallow spit on which there are several large boulders, extends ENE for about 4.5 miles from the light and is marked by a lighted buoy.

A coastal bank, with depths of less than 6m, surrounds Anholt and may best be seen on the chart. This bank extends about 6 miles NW from the NW extremity of the island and is marked by a buoy. It extends about 4 miles WSW from the SW side of the island and is marked by a lighted buoy. However, on the SE side of the island, the bank is very narrow, with depths of 20m lying only about 0.5 mile offshore.

Nordvestrev, a narrow reef, extends about 5 miles NW from the NW extremity of the island. Depths of less than 2m lie at the outer part of the reef and the inner part dries.

Anholt Havn (56°43'N., 11°31'E.), situated on the W side of the island, is formed by two curved breakwaters. It is used by fishing vessels and pleasure craft. The entrance is 45m wide and has a depth of 3.7m. It is subject to silting. Vessels up to 75m in length, 15m beam, and 3.2m draft can be accommodated.

A sector light is shown from the N head of the outer breakwater. Anholt Church, with a white spire, is conspicuous but can only be seen from the S.

The main approach channel leads SE across the coastal bank and has a least depth of 4.2m. An alternate approach channel leads NE to the harbor and has a least depth of 3.2m.

Large vessels can anchor off the N side of the island, in depths of 8 to 12m, sand. Small vessels can anchor off the W side of the island, but large vessels must moor so far offshore that the island offers little shelter from the sea raised by E winds.

Caution.—A Nature Reserve Area, into which entry is prohibited, fronts the NE extremity of Anholt and extends about 0.4 mile seaward.

Several restricted areas lie within 7 miles S and SW of Anholt and may best be seen on the chart. Anchoring, fishing, or other seabed activities are prohibited in these areas due to the existence of bottom mines. Two similar areas lie 2 miles NNW and 14.5 miles SSW of the island.

7.13 Hesselo (56°12'N., 11°43'E.), 20m high, is a small island located about 32 miles S of the E extremity of Anholt. A light is shown from a prominent tower, 24m high, standing on the summit of the island.

A reef, on which there are some rocks awash, extends NW for about 2 miles from the NW extremity of the island and is marked by a buoy. A narrow sandspit, with depths of less than 3m, extends SE for about 1 mile from the SE end of the island and is marked by a lighted buoy. A rock, on which the sea breaks during storms, lies at the outer end of this spit.

Vessels navigating in this area without local knowledge are advised not to approach the island within a depth of 20m.

Lysegrund (56°18'N., 11°48'E.), a large and shallow shoal, lies centered about 6 miles NNE of Hesselo. The bottom of this shoal consists mainly of sand, with scattered patches of weed, but in depths of less than 4m there are rocks. The discoloration over the shoal can usually be seen from a short distance. The NW and SW extremities of the shoal are marked by buoys.

A light is shown from a structure, 9m high, standing on the NE part of the shoal.

Lille Lysegrund (56°18'N., 11°30'E.), a detached rocky shoal, lies 9 miles NW of Hesselo and has a least depth of 7.6m.

7.14 Briseis Flak (56°20'N., 11°20'E.) lies about 15 miles W of Lysegrund Light. This shoal has a least depth of 4m and is marked by a buoy. The bottom on this shoal consists mainly of light-colored sand, gravel, and stones.

Hastens Grund (56°14'N., 11°12'E.) lies about 17 miles W of Hesselo Light. This narrow shoal bank has a least depth of 2.5m and is marked by a buoy. The bottom is mostly gravel, with patches of fine sand and rock.

Schult's Grund (56°10'N., 11°11'E.) lies about 1.5 miles S of the S end of Hastens Grund. This shoal bank has a least depth of 3.8m and is marked by a buoy and a lighted buoy.

Route T passes between Lille Lysegrund and Briseis Flak. It continues in a SW direction and passes SE of Hastens Grund and Schult's Grund.

Caution.—A restricted conservation area, within which wild animals and birds are protected, extends up to 3 miles seaward of Hesselo. Vessels are prohibited from passing over the reefs between 15 April and 30 September.

Restricted Areas lie centered 7.5 miles WNW and 9 miles NW of Hesselo Light. Anchoring, fishing, or other seabed activities are prohibited in these areas due to the existence of bottom mines. Similar areas lie centered 5.5 miles W and 3.5 miles SW of Briseis Flak.

7.15 Eastern Channel.—Eastern Channel, the main passage in the Kattegat, lies E of Laeso and Anholt. It is known as Osterrannan by the Swedish and Osterrenden by the Danish. Route T initially follows this channel and then leads SW from a position located close E of Anholt.

Dybe Rende (57°45'N., 11°20'E.), a deep with depths of 75 to 110m, is located in the N part of this passage and may best be seen on the chart. It lies from 9 to 14 miles off the Swedish mainland coast and extends from the Skagerrak to the parallel of Fladen Light (57°13'N., 11°50'E.). The bottom of this deep consists of clay.

In the S part of the passage, the bottom consists of mud and blue clay in depths over 28m. In lesser depths, the bottom consists of sand and shells, but farther inshore, coarse sand and gravel are found.

Fladen (57°10'N., 11°45'E.) and Lilla Middelgrund (56°57'N., 11°56'E.) lie on the E side of the passage. These shoals are described fully in paragraph 6.18 and paragraph 6.21, respectively.

Stora Middelgrund (56°33'N., 12°06'E.), an isolated rocky shoal bank, lies in the S part of the passage, about 18 miles SE of Anholt Light. It has a least depth of 6.6m.

7.16 Western Channel.—Western Channel is the passage leading W of the islands and shoals lying in the middle of the Kattegat. The passage leads S from E of Skagen and crosses the broad flat, with depths of 20 to 30m, which lies E of Albaek (57°36'N., 10°25'E.). It then passes through Laeso Rende. Route B leads S through the N part of this channel. The track then continues SE across the S part of the Kattegat to the entrance of The Sound.

Herthas Flak (57°38'N., 10°52'E.), a detached shoal bank, lies about 10 miles SE of Skagen Light and has a least depth of 9.2m.

Laeso Rende (57°17'N., 10°42'E.) is the channel lying between the dangers fronting the Danish coast and the shoals extending seaward from the W side of Laeso. The fairway within Laeso Rende has a least depth of 12m.

Laeso Rende Light (57°13'N., 10°40'E.), equipped with a racon, is shown from a prominent tower, 26m high, standing about 6.5 mile WSW of the W extremity of Laeso. This light marks the W side of the channel.

Laeso Rende Light

At a position located about 13 miles SSE of Laeso Rende Light, the channel widens but it is obstructed by a number of shoal banks, which lie parallel to the coast and may best be seen on the chart.

For information concerning the Danish coast extending S of Skagen and the waters in the SW part of the Kattegat, see Sector 8.

Sjaelland—North Coast

7.17 Sjaelland (55°35'N., 12°00'E.) is the largest island in an archipelago which stretches between the Swedish coast and Jylland (Denmark). The Sound leads S off the E side of this island and the Store Baelt leads S off the W side. A considerable amount of marine traffic uses these two passages. The N coast of the island, which lies at the S end of the Kattegat, extends between Gilbjerg Hoved and the peninsula of Rosnaes, 53 miles WSW.

Gilbjerg Hoved (56°08'N., 12°18'E.), the NW entrance point of The Sound, consists of a steep cliff, 33m high, lacking any tree growth.

Gilleleje, a resort town with a prominent water tower and church, stands about 0.7 mile ESE of the point. Nakkehoved Light is situated 1.7 miles ESE of the point. These landmarks and the waters lying E of Gilbjrg Hoved are described with the The Sound in Pub. 194, Sailing Directions (Enroute) Baltic Sea (Southern Part).

For about 2 miles WSW of Gilbjerg Hoved, the coast is quite low. It then rises to steep light-colored cliffs until close NE of Tisvilde, a village situated about 5 miles farther SW. A prominent church stands at Vejby, 2 miles E of Tisvilde.

Tisvilde Hegn, a large wooded area, is situated close SW of Tisvilde and 9 miles SW of Gilbjerg Hoved. It is conspicuous from seaward. Salgardshoj, a hill, rises about 2 miles NE of Tisvilde. It is 49m high and surmounted by a radio mast.

Spodsbjerg Light (55°59'N., 11°52'E.) is shown from a tower, 9m high, standing on a prominent point of the same name, 16 miles SW of Gilbjerg Hoved. The coast between is fronted by a bank, with depths of 5m lying up to about 1.2 miles offshore in places.

Isefjord (55°55'N., 11°50'E.) is entered between Spodsbjerg Light and Korshage, a low and sandy point, 2.5 miles W. Gronnerevle, a large sand bank with depths of less than 6m, fronts Korshage and is marked by buoys. It extends up to about 2.2 miles N from the shore and E to within 1 mile of Spodsbjerg Light. For a further description of Isefjord, see paragraph 7.21.

Spodsbjerg Light

Caution.—An explosive dumping area, which may best be seen on the chart, lies centered about 6 miles WNW of Gilbjerg Hoved and is marked by buoys. Navigation by unauthorized vessels is prohibited in the area.

An unexploded ordnance area, which may best be seen on the chart, lies centered about 7 miles NW of Gilbjerg Hoved.

A firing practice area, marked by buoys, fronts the coast between Tisvilde and Spodsbjerg Light. Warning signals are displayed from two signal stations situated on the coast when firing is in progress.

7.18 Gniben (56°01'N., 11°17'E.), 19m high, is the NW extremity of Sjaellands Odde, the peninsula forming the NW end of Sjaelland. This peninsula is mostly low but there are a few hills on its central part.

A conspicuous mill, without sails, stands at Yderby, about 3 miles SE of Gniben. A prominent church is situated at Odden, 5 miles SE of Gniben.

Sjaellands Rev (56°04'N., 11°15'E.) is a narrow and dangerous reef which extends NNW for about 5 miles from Gniben. It is divided into three parts by two rocky channels. Inderrevet, the inner part of the reef, extends N for about 2 miles from Gniben; Mellemrevet, the central part, is very narrow and about 1 mile long; and Yderrevet, the outer part, is about 3 miles long and dries over a considerable length.

The sea breaks on all parts of this reef with the least wind and, in calm weather, its outline can be seen from a considerable distance due to the race showing on the side opposite to that which the current is flowing toward.

Sjaellands Rev N Light (56°06'N., 11°12'E.), equipped with a racon, is shown from a prominent tower, 26m high, standing about 1 mile NNW of the N extremity of Sjaellands Rev. A refuge beacon and hut, 7m high, is situated on Yderrevet, about 1.8 miles SSE of the light.

Anchorage can be taken by large vessels, in depths of 20 to

Sjaellands Rev N Light

25m, fine sand and cobbles, about 3 miles SW of Sjaellands Rev N Light.

Yderflak Light (56°04'N., 11°01'E.), situated 6.5 miles WSW of Sjaellands Rev N Light, is described in paragraph 8.40.

Caution.—Restricted areas, which may best be seen on the chart, lie centered 1.5 miles NE and 1.2 miles W of Gniben. Anchoring, fishing, or other seabed activities are prohibited in these areas due to the existence of bottom mines. A similar area fronts the S shore of Sjaellands Odde, 4 mile SE of Gniben.

Numerous wrecks, which may best be seen on the chart, lie off the coast between the entrance to The Sound and Sjaellands Rev.

A firing practice area is situated in the vicinity of Sjaellands Odde. It extends up to about 5.5 miles W, 5 miles N, and 11 miles E of Sjaellands Rev N Light. Target floats and buoys may be moored within this area.

7.19 Sejero (55°53'N., 11°09'E.), a narrow island, lies 8 miles SW of Sjaellands Odde and is fringed by a shallow bank. It is located in the middle of Sejero Bugt, a large bay, which is entered between Sjaellands Rev and Rosnaes, 21 miles SW.

A light is shown from a prominent tower, 19m high, standing on Gniben, the N extremity of the island. A conspicuous church is situated near the middle of the island. Kongshoj, a conspicuous hill, rises near the SE extremity of the island and is 30m high. Sejero Havn, a small harbor, is situated in the middle of the S side of the island. It is used only by local ferries, pleasure craft, and fishing vessels.

Sejero NW Rev, a bank with depths of less than 5m, extends NW for about 1 mile from the NW end of the island and is marked by a buoy. Sejero Puller, a detached shoal with a depth of 5.8m, lies about 1.5 miles NW of the NW extremity of the island and is the outermost danger in this vicinity.

Sejero SE Rev, a shallow bank, extends SE for about 2 miles from the SE extremity of the island and is marked by a buoy.

Sejero Bugt is navigable by large vessels and provides good anchorage, but it is little used. The NE side of the bay, S of Sjaellands Odde, is low. The land rises at Ordup Naes, a protruding cliffy point located 4.8 miles ESE of the S end of Sejero, where there are several hills. A chain of shoals, with

Sejero (Gniben) Light

depth of less than 5m, extends up to about 2.3 miles W of this point and is marked by a buoy.

Several conspicuous radio masts stand along the shore of the bay about 2 miles E of Ordup Naes. A prominent castle is situated at Dragshom, 4.5 miles S of Ordup Naes. A conspicuous television mast, with an aeronautical light, stands at Jyderup (55°41.1'N., 11°27.8'E.), about 5.8 miles SSE of the castle.

The S side of Sejero Bugt is low and woodless in the E part, but rises near the peninsula of Rosnaes. Nekselo, a hilly and woodless island, lies 4.3 miles SW of Ordup Naes and its S end is connected to the shore of the bay by a ridge which nearly dries. A detached shoal, with a depth of 3.8m, lies 1.4 miles N of the N end of this island.

Havnso Havn, a small and shallow harbor, lies on the S shore of the bay, 5.5 miles SSW of Ordup Naes. It is used only by fishing vessels, pleasure craft, and local ferries. A conspicuous windmill stands close W of the harbor.

Leveret (55°53'N., 11°00'E.), a chain of detached shoals, lies with its NW end located about 4.8 miles WSW of Sejero (Gniben) Light. This chain extends about 7 miles SE and the shoal patches have depths of 5.6 to 9.3m.

Information concerning the Samso Baelt and the dangers lying W of Sjaellands Odde and Sejero is given beginning in paragraph 8.39.

7.20 Rosnaes (55°45'N., 10°52'E.), the SW entrance point of Sejero Bugt, is the NE entrance point of the Store Baelt. This peninsula rises to barren hills, 60m high, and terminates in a narrow point faced with cliffs, l0m high. Rosnaes Rev, a shallow reef, fronts the point and extends up to about 0.5 mile seaward.

Rosnaes Light (55°45'N., 10°52'E.) is shown from a prominent tower, 15m high, standing at the W extremity of Rosnaes.

A small fishing harbor is situated on the N shore of the peninsula, 2.5 miles E of the light. The entrance, 16m wide,

Rosnaes Light

faces SE and has a controlling depth of 2.8m.

Rosnaes Puller (55°45'N., 10°51'E.), a reef with large rocks, lies about 1.3 miles W of Rosnaes. A narrow channel, with a depth of 6.4m, leads between the inner side of this reef and the W extremity of Rosnaes Rev.

Rosnaes Puller Light (55°45'N., 10°51'E.) is shown from a prominent mast on a granite base, 9m high, standing on the NW part of the reef.

For information concerning the Store Baelt and the waters lying S of Rosnaes Puller Light, see Sector 2 of Pub. 194, Sailing Directions (Enroute) Baltic Sea (Southern Part).

Caution.—A restricted area, which may best be seen on the chart, lies close S of the S end of Sejero. Anchoring, fishing, or other seabed activities are prohibited in this area due to the existence of bottom mines.

A firing practice area fronts the S shore of Sejero Bugt and extends up to 8.5 miles W of Nekselo.

7.21 Isefjord (55°56'N., 11°48'E.) is entered between Spodsbjerg Light and Korshage, 2.5 miles W, which have been previously described in paragraph 7.17. This inlet extends S for about 15 miles and is divided into Yderbredning and Inderbredning.

The entrance is obstructed by sand banks which may best be seen on the chart. Three channels lead across these banks. The approach route leads SSE and S from a position located 4 miles NNW of Spodsbjerg Light. The main channel leads in a S direction and is entered about 0.5 mile W of the light.

The W side of the entrance, between Korshage and Skansehage, 2 miles SSE, is low, sandy, and covered with dunes. The E side of the entrance is formed by the NW side of the Halsnaes Peninsula.

Yderbredning, an extensive basin, lies S of the entrance and has general depths of 8 to 9.5m. It extends S for about 8 miles to the island of Oro. Interbredning, the inner part of the fjord, extends about 3 miles S from the reef fronting the S end of Oro. It has general depths of 6 to 7.7m.

Oro Ostre Lob, an unmarked channel, leads E of Oro. It is shallow and narrow in places. Oro Vestre Lob, the main channel, leads W of Oro and is marked by sector lights.

Tides—Currents.—The range of tide in Isefjord is about 0.2m. During calm weather, the ebb and flood currents are weak and occur at regular intervals. In N or S storms, the currents may set in the same direction for 18 hours or longer and attain rates up to 1.5 knots in the entrance channels.

Storms may cause abnormal water levels in the harbors located within the fjord. The levels may be increased by up to 1.8m or reduced by as much as 1.2m.

Depths—Limitations.—The main entrance channel, which is 70m wide, is dredged to a least depth of 6.4m (1999).

Oro Vestre Lob, the main channel leading W of Oro, has depths of 6.2 to 15m in the fairway.

Aspect.—An outer approach lighted buoy is moored about 1.4 miles NNW of Spodsbjerg Light. The main entrance channel is marked by buoys and lighted buoys.

Pilotage.—Pilotage is compulsory in the fjord for all tankers. Pilots for Hundested Havn and other ports within Isefjord can be contacted by VHF and board about 1.8 miles NNW of Spodsbjerg Light. For further information, see Pilotage in paragraph 7.1.

Regulations.—In the main entrance channel and in the approaches to the harbors located within Isefjord, outbound vessels must give way to inbound vessels.

Caution.—Several practice firing areas, used by the Danish Navy, are situated within Isefjord. Special regulations are in force and warning lights are shown when the areas are in use.

Fish traps are laid out over the shoals lying W of the entrance to Isefjord annually from March to June.

A submarine cable extends across the entrance to Isefjord and may best be seen on the chart.

Due to the entrance being subject to silting and unmarked shoals lying within Yderbredning, local knowledge is required.

7.22 Hundested Havn (55°58'N., 11°51'E.) (World Port Index No. 29390), a small port, lies on the E side of the entrance to Isefjord, 0.8 mile SSW of Spodsbjerg Light.

The old harbor, used by fishing boats and small commercial vessels, is protected by two moles. It has an entrance, 40m wide, with a depth of 5.5m. The ferry harbor is protected by two moles. It has an entrance, 80m wide, with a depth of 7m. Vessels up to 90m in length, 14m beam, and 5m draft can be accommodated in the old harbor. Automobile ferries up to 6.5m draft can be accommodated in the ferry harbor, which has a berth, 220m long. The harbors are subject to silting.

Hundested Havn may be contacted by e-mail, as follows:

mail@hundestedhavn.dk

Lynaes Havn (55°57'N., 11°52'E.), a small fishing harbor, lies near the SW extremity of Halsnaes, 1.4 miles S of Hundested Havn. It is protected by two breakwaters and has a controlling depth of 3m.

Rorvig Havn (55°57'N., 11°46'E.), a small harbor, lies at the W side of the entrance, 3.5 miles W of Lynaes Havn. It has a controlling depth of 3m and is used by fishing vessels and local ferries. A church and a wind mill, both prominent, stand about 1.2 miles W and 0.6 mile SW, respectively, of the harbor.

Nykobing Havn (55°55'N., 11°41'E.), a small harbor, lies at the NW side of Yderbredning, 3.5 miles WSW of Rorvig Havn. It has a controlling depth of 3m and is mainly used by pleasure boats and small craft. Vessels up to 50m in length,

10m beam, and 2.7m draft can enter. A conspicuous church stands in the town 0.8 mile N of the harbor. For pilotage, see section 7.1.

7.23 Kynbyvaerkets (55°49'N., 11°53'E.), a small harbor, is located at the SE end of Yderbredning and serves a large power station. The main quay, 280m long, has a depth of 7.2m alongside and is protected by a breakwater. Vessels up to 250m in length, 40m beam, and 6m draft can be accommodated. Vessels must berth only during daylight. The approach to the harbor is indicated by a lighted range.

Kynbyvaerkets

A number of conspicuous chimneys stand at the power station, close E of the harbor. Three prominent wind generators are situated near the shore 0.5 mile NE of the harbor. The conspicuous tower of an ancient palace stands at Jaegerspris, 4.3 miles NE of the harbor.

Holbaek (55°43'N., 11°43'E.) (World Port Index No. 29400), a small port, lies about midway along the S side of Holbaek Fjord, which extends 4 miles W from the NW side of Inderbrening. The shores in this vicinity are almost treeless. The town itself extends along a considerable part of the S shore of the fjord.

Shallow banks extend from both sides of the fjord. A channel, marked by buoys and indicated by a lighted range, leads WSW to the harbor. It is 30m wide and dredged to a depth of 6.4m. The main commercial quay is 530m long and has depths of 2.6 to 6.4m alongside. Vessels up to 110m in length and 6m draft can be accommodated.

7.24 Roskilde Fjord (55°56'N., 12°00'E.) leads from Isefjord, through Kulhus Rende, along the S side of the Halsnaes Peninsula. This inlet, which is narrow, extends about 5 miles E and then 18 miles S to the city of Roskilde, at its head.

Frederiksvaerk (55°58'N., 12°01'E.) (World Port Index No. 29415) is situated at the NE end of Roskilde Fjord. The port consists of Stalvalsevaerks Havn, which serves a steel mill, and Frederiksvaerk Gamle Havn, the old harbor, which is disused.

Stalvalsevaerks Havn, a basin, is protected by two short breakwaters. The entrance channel is 40m wide and has a controlling depth of 6m. The basin provides about 1,100m of berthage, with a depth of 6m alongside. Vessels up to 130m in length, 40m beam, and 5.8m draft can be accommodated.

Frederiksvaerk

The **Kronprins Frederiks Bridge** (55°51'N., 12°02'E.) carries both road and rail traffic across the fjord about 7.5 miles S of Frederiksvaerk. It is a fixed bridge, supported by three pillars, which has a movable double-bascule section at the E side. The bascules provide a passage 29.8m wide.

For information on pilotage, see Pilotage in paragraph 7.1.

Frederiksvaerk (Stalvalsevaerks Havn) may be contacted by e-mail, as follows:

info@dansteel.dk

7.25 Frederikssund (55°50'N., 12°03'E.) (World Port Index No. 29410) is situated close S of the Kronprins Frederiks Bridge. The harbor consists of four basins and is protected by a breakwater. The entrance is 50m wide and has a controlling depth of 4.2m. Nyhavn, the main commercial basin, has a berth, 200m long, with depths of 5.6 to 5.8m alongside. Vessels up to about 4,000 dwt and 4m draft can be accommodated.

An overhead power cable spans the channel about 2 miles S of Frederikssund and has a vertical clearance of 22m.

For information on pilotage, see Pilotage in paragraph 7.1.

Frederikssund may be contacted by e-mail, as follows:

tfpost@frederikssund-kom.dk

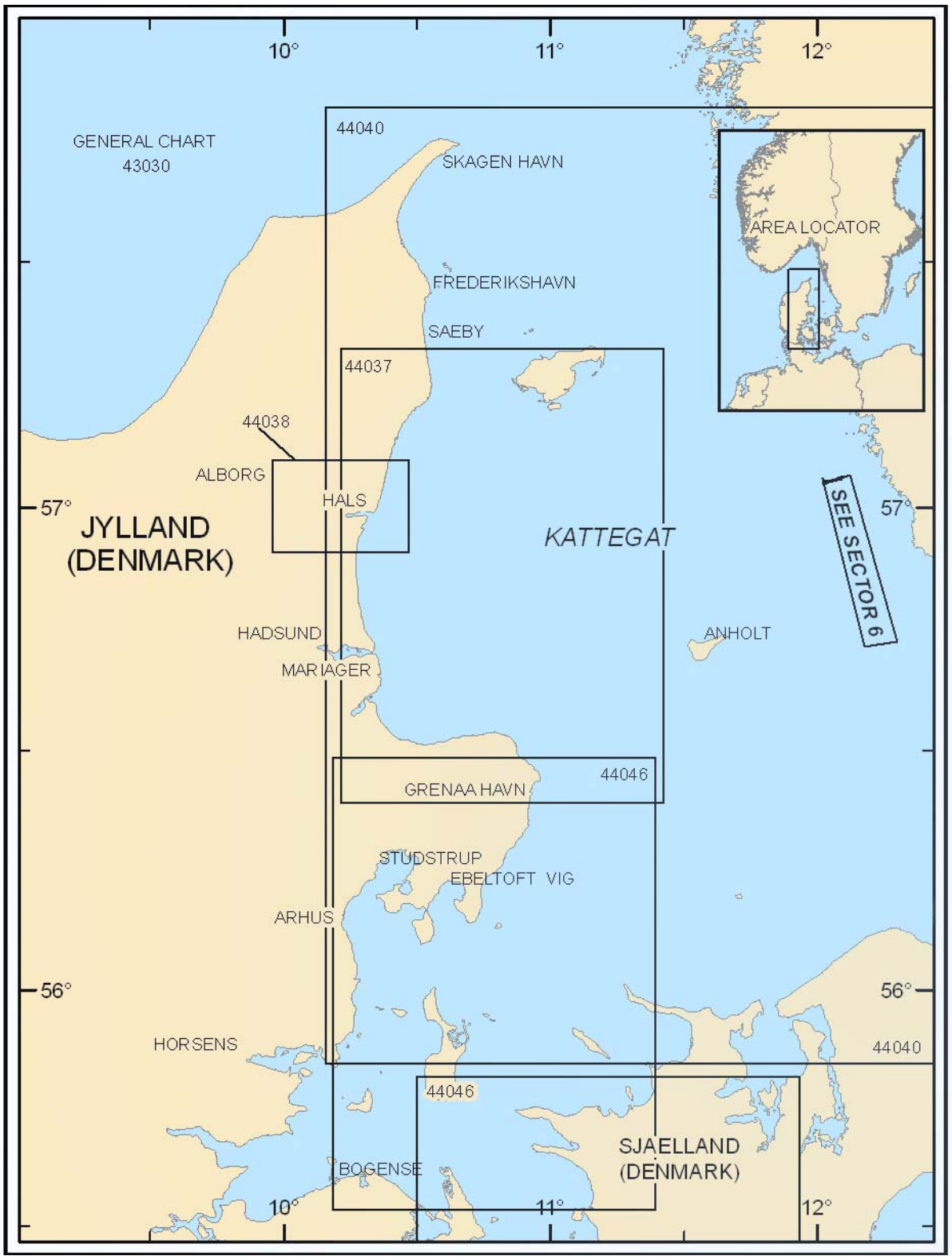
Roskilde (55°39'N., 12°05'E.) is situated at the head of the fjord. The channel above Frederikssund is shallow and only pleasure boats and small craft can reach this small harbor.

Additional pilotage requirements may be stated along with each port description.

Pilots should be ordered by inbound vessels at least 18 hours prior to the ETA at the boarding station. A confirmation or correction should then be sent 4 hours before arrival.

Vessels should state the following when ordering the pilot:

1. Vessel name, call sign, and IMO Number.
2. Gross tons, length, beam, draft, and speed.
3. Nature of cargo.
4. ETA at boarding position.
5. Destination for pilotage.
6. Any faults affecting maneuverability.
7. Contact and payment information.
8. Payer's information.



Additional chart coverage may be found in NGA/DLIS Catalog of Maps, Charts, and Related Products (Unlimited Distribution).

SECTOR **8** — CHART INFORMATION

SECTOR 8

DENMARK—EAST COAST—SKAGEN TO BJORNSKNUDE

Plan.—This sector describes the E coast of Jylland (Denmark) from Skagen to Bjornsknude, at the entrance to the Lille Baelt. The descriptive sequence is from N to S.

General Remarks

8.1 The E coast of Jylland is generally low, flat, and sandy. It is indented by several fjords and some hills rise inland. Limfjorden (57°00'N., 10°19'E.) leads W from the Kattegat to the North Sea. It consists of a number of lakes connected by narrow passages. This waterway has a depth of 4m and can only be used by small craft.

The principal commercial ports located on the E coast of Jylland, from N to S, are Frederikshaven, Alborg, Arhus, and Horsens.

That part of the Kattegat lying W of a line connecting Laeso (57°17'N., 11°00'E.) and Fornaes Light, 47 miles S, is known as Alborg Bugt.

For information concerning ice, pilotage, and Route B, which leads S through this area, see paragraph 7.8.

For information concerning danger areas and related subjects related to the waters covered by this sector, see Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

Tides—Currents.—The currents off this coast are seasonal and not easy to predict. However, at times, the currents can attain considerable strength.

The tidal range along this coast is negligible. Consequently, the tidal currents, except within the fjords, are weak, variable, and depend largely on the effects of the wind. Tidal currents, where relevant, are described with each port.

Pilotage.—For information concerning pilotage in Danish waters, see Pilotage in paragraph 7.1.

Caution.—Several mine danger areas, which may best be seen on the chart, lie within the Kattegat. Anchoring, fishing, and any other seabed activities are prohibited in these areas. The risks to surface navigation in the areas are considered to be no more than the normal marine hazard.

Skagen to Limfjorden

8.2 **Skagen** (57°44'N., 10°37'E.), also known as The Skaw, forms the NE extremity of Jylland and is fully described in paragraph 7.7.

Albaek Bugt (57°35'N., 10°33'E.) indents the coast between Skagen and Frederikshavn, about 19 miles SSW. The N part of this bight consists of sand hills backed by low land but cultivated fields and numerous buildings are situated along the S part. Woods are located in the vicinity of Frederikshavn. Depths of 18 to 23m lie within the central part of this bight and shoal gradually toward its head.

Vessels can anchor in the N part of Albaek Bugt, in regular depths of less than 20m. The bottom is sand with good holding ground. In depths of over 20m, the holding ground is not good because the bottom is hard in places.

8.3 **Skagen Havn** (57°43'N., 10°36'E.) (World Port Index No. 30440), a small commercial port and fishing center, is situated in the N part of Albaek Bugt, about 2 miles SW of the NE extremity of Skagen.

Skagen Havn

Tides—Currents.—The tidal range is 0.3m. Strong winds from W may raise the water level by up to 1.4m and winds from E may lower it by as much as 0.9m. Winds from between W and SSW may cause a NE current and those from between N and SSE may cause a SW current. The prevailing current runs NE across the harbor entrance at rates up to 2 knots.

Depths—Limitations.—The harbor has six basins and is protected by two converging breakwaters. The entrance faces SE and is 75m wide. The entrance channel and outer part of the harbor have a least depth of 9m. The three inner basins have depths of 3.5 to 7m and are mainly used by fishing vessels and small craft. The three outer basins provide a total of 1,500m of quayage, with depths of 7 to 9m alongside.

Vessels up to 130m in length, 18m beam, and 6.7m draft can be accommodated during favorable weather.

It is reported (1998) that vessels entering the westernmost inner basin are limited to an air draft of 27m.

Aspect.—The entrance channel is indicated by a lighted range. A conspicuous church stands 1.3 miles WSW of the harbor. For more information concerning landmarks and aids in this vicinity, see paragraph 7.7.

Pilotage.—Deep Sea (Transit) Pilots are available from Skagen (Skaw Pilot). For more information, see paragraph 7.1 and paragraph 7.8.

Pilots for the local habor can be contacted by VHF and board about 0.8 mile SE of the entrance. For further information, see Pilotage in paragraph 7.1.

Regulations.—Outbound vessels must give way to inbound vessels.

The maximum speed limit within the outer harbor is 3 knots.

In order not to impede vessels arriving or departing, fishing is prohibited within 700m of the harbor entrance.

Skagen Havn may also be contacted by email:

hv@skagenhavn.dk

Skagen Havn Home Page

http://www.skagenhavn.dk

Anchorage.—Vessels can anchor, in depths of 14 to 17m, off the harbor entrance.

8.4 **Albaek Havn** (57°36'N., 10°26'E.), a small craft harbor, is located in the central part of Albaek Bugt, 9 miles SSW of Skagen Havn. It consists of two basin and has depths of 2 to 3.2m. A conspicuous church, with a red pointed tower, stands in the town.

Prominent churches are situated at Hulsig and Jersup, which are located 4 miles NNE and 4 miles S, respectively, of Albaek Havn.

Krageskov Rev (57°33'N., 10°28'E.), a group of three rocky shoals, lies about 1.2 miles offshore, 3 miles SSE of Albaek Havn. These detached patches have depths of 3.4 to 5.3m.

Strandby Havn (57°30'N., 10°30'E.), a small fishing harbor, lies 6.2 miles SSE of Albaek Havn and is protected by two breakwaters. The entrance channel is 50m wide and has a least depth of 4m. Vessels up to 50m in length, 10m beam, and 3.5m draft can enter.

A conspicuous church, with a tower, stands at Elling, 1.4 miles SSW of Strandby Havn.

Hirsholmene (57°29'N., 10°38'E.) consists of several rocky islets and two low islands, Hirsholm and Graesholm. This group lies 3.5 miles E of Strandby Havn near the edge of the coastal bank. Both islands are flat and devoid of trees. A small boat harbor is located at the SW side of Hirsholm, the southeasternmost island. A shallow shoal flat, marked by buoys, extends WSW from this group to the coast.

A light is shown from a prominent tower, 27m high, standing on the summit of Hirsholm. Foul ground extends up to about 1.4 miles NNW and 0.5 mile NE of the light and is marked by buoys.

Caution.—A restricted area, which may best be seen on the chart, fronts the coast S of Albaek Havn and extends up to about 7 miles seaward. Anchoring, fishing, or other seabed activities are prohibited in this area due to the existence of bottom mines.

From May to November, mooring buoys, for the use of small craft, are situated about 2 miles NW and 0.7 mile S of Hirsholm Light.

The waters in the vicinity of Hirsholm are designated as a nature reserve area. Special regulations apply to vessels navigating, fishing, and anchoring within this area.

Frederikshavn (57°26'N., 10°33'E.)

World Port Index No. 30430

8.5 Frederikshavn, an ice-free port, is situated 18 miles S of Skagen. The harbor, which is used by commercial vessels and fishing boats, is also a naval base. It is protected by two converging breakwaters.

Tides—Currents.—The tidal range is about 0.3m. During gales from W the water level may be increased by up to 1.2m and during gales from E the level may be reduced by as much as 0.8m.

The current sets directly across the harbor entrance, depending on the wind, and may exceed a rate of 2 knots at times.

Depths—Limitations.—Foul ground, shallow shoals, and rocks awash extend up to about 1.7 miles NE, 1.4 miles E, and 1.2 miles ESE of the harbor entrance and may best be seen on the chart. A secondary approach channel, indicated by the white sector of the N breakwater light, leads W through these dangers, which are marked by buoys, and has a least depth of 6.9m.

The main approach channel leads NW and passes SW of these dangers. This channel, along with the greater part of the outer harbor, has a dredged depth of 8m.

Nordhavn Basin and Commercial Basin provide about 4,800m of total quayage. Facilities for fishing vessels are situated at the NW side of Nordhavn Basin. The main quay in this basin, situated at the E side, is 600m long and has a depth of 7m alongside.

The main quay in Commercial Basin is 280m long and has a depth of 8m alongside. An oil berth is situated at the SE side of this basin; it is 195m long and has a depth of 8m alongside.

The Ferry Basin provides four berths with depths of 5.6 to 8m alongside. The naval base is located in the S part of the port.

There are facilities for general cargo, container, ro-ro, tanker, passenger ferry, and fishing vessels. Generally, with favorable weather conditions, cargo vessels up to 180m in length and tankers up to 208m in length can be accommodated, with drafts up to 7.5m. It is reported that vessels up to 215m in length can enter for dry docking.

A shipyard, two dry docks, and two floating docks are situated in the harbor. The largest dry dock is 215m long and 43m wide; it can handle vessels up to 60,000 dwt.

Aspect.—An outer approach lighted buoy, equipped with a racon, is moored about 1.8 miles SE of the harbor entrance. Lights are shown from both breakwater heads. The main approach channel is indicated by a lighted range, which may best be seen on the chart.

A conspicuous church, with a tower and spire, is situated in the town near the harbor. A conspicuous church, with a tower, stands at an elevation of 111m at Flade, about 2.8 miles WSW of the harbor.

Pilotage.—Pilots can be contacted by VHF and board about 1 mile SE of the outer approach lighted buoy.

For further information, see Pilotage in paragraph 7.1.

Regulations.—Vessels must report to the harbor office by VHF on arrival.

Vessels entering the harbor must give way to vessels leaving. Vessels leaving or entering the naval base or the fishing harbor must give way to ships entering or leaving the commercial harbor.

Speed limits of 12 knots apply within the harbor limits outside the breakwaters, 7 knots in the outer harbor, and 3 knots elsewhere in the harbor.

Frederikshavn can also be contacted by:

info@frederikshavnhavn.dk

Frederikshavn Home Page
http://www.frederikshavnhavn.dk

Caution.—The depths in the approach channels are subject to change due to shifting sands.

A mooring buoy is situated about 3.2 miles SE of the harbor entrance. Two submarine oil pipelines, which may best be seen on the chart, extend in a W direction between this buoy and the coast.

8.6 Saeby (57°20'N., 10°32'E.), a small harbor, is situated 6 miles S of Frederikshavn and is protected by two breakwaters. The entrance, which faces E, has a controlling depth of 3.6m but is subject to silting. Vessels up to 50m in length, 8m beam, and 3.2m draft can enter. A water tower and a church, both conspicuous, are situated in the town.

A prominent church stands at Karup, about 5 miles WNW of Saeby. Bangsbo Bakker, a range of hills, extends N from Saeby to close S of Frederikshavn with only a narrow coastal strip.

Stensnaes (57°14'N., 10°32'E.) is located 6.5 miles S of Saeby. The coast between is backed by low sand dunes, about 1.5 miles inland. A conspicuous church is situated at Lyngsaa, 1.5 miles NW of Stensnaes.

Laeso Rende (57°17'N., 10°42'E.), the channel leading between the dangers fronting the coast and the shoals extending seaward from the W side of Laeso, lies 5.5 miles E of Stensnaes.

Laeso Rende Light (57°13'N., 10°40'E.), equipped with a racon, is situated 4.5 miles E of Stensnaes and marks the W side of the channel.

Laeso Rende, through which Route B leads, forms part of Western Channel. For more information concerning this channel and Laeso Rende Light, see paragraph 7.16; further information on the landmarks on the island of Laeso can be found in paragraph 7.9.

Caution.—A restricted area, which may best be seen on the chart, fronts the coast in the vicinity of Stensnaes and extends 1 mile seaward. Anchoring, fishing, or other seabed activities are prohibited in this area due to the existence of bottom mines.

A submarine cable area, which may best be seen on the chart, extends E between Stensnaes and Laeso.

8.7 Dvalegrunde (57°13'N., 10°39'E.), a shoal with a least depth of 2.5m, lies about 3 miles E of Stensnaes and extends about 3 miles NNW of Laeso Rende Light. It is marked on the W side by a buoy and on the SE side by a lighted buoy.

The bottom off this part of the coast consists of hard sand with weeds in some places. Under certain conditions, the light-colored sand on the shoals is visible for a distance. This is particularly noticeable with respect to Dvalegrunde.

Between Stensnaes and the entrance to Limfjorden, 16 miles SSW, the coast is flat and partly wooded. There is a forested range of hills, known as Jyske Aas, situated several miles inland. Knosen, 136m high, rises about 9 miles WSW of Stensnaes. This hill, which is conspicuous from seaward, is the tallest peak of Jyske Aas.

Hals Barre Light (56°57'N., 10°26'E.), equipped with a racon, is shown from a prominent tower, 15m high, standing about 3.8 miles offshore, 17 miles SSW of Stensnaes. An

Hals Barre Light

Svitringen Rende S Light (56°51'N., 10°36'E.), equipped with a racon, is shown from a prominent mast, 15m high, standing about 8.5 miles SE of Hals Barre Light.

Stensnaes Flak, a shallow shoal flat, forms part of the coastal bank and extends up to about 2 miles S of Stensnaes.

An extensive chain of shoal flats extends about 14 miles S from Stensnaes Flak to the vicinity of Hals Barre Light. These flats have a least depth of 4m and may best be seen on the chart. The N part of the chain is known as Middelgrund and the S part, marked by a lighted buoy moored about 3 miles ENE of Hals Barre Light, is known as Svitringen. Langerevle, lying E of Svitringen, has depths of 6.9 to 9.7m. This bank extends S from the outer part of Middelgrund to close NE of Svitringen Rende S Light. Several banks, with depths of 6.5 to 9.7m, lie up to 9 miles E of the S part of Langerevle. These banks lie mostly parallel to the coast and may best be seen on the chart.

A channel, used only by small vessels with local knowledge, lies 2 to 3 miles offshore and parallel to the coast. It is entered through Landdybet, which leads between Dvalegrund and Stensnaes Flak. This channel, which has a controlling depth of 4.4m, passes E of the coastal bank and W of Middelgrund and Svitringen.

Voersa and Asaa Havn are two small fishing harbors situated 2 miles SW and 6 miles SSW, respectively, of Stensnaes. Asaa Havn, protected by breakwaters, is located on a small island, which is connected to the shore by an embankment, 450m long.

Hou, a yacht harbor, is situated 4 miles N of the entrance to Limfjorden and protected by breakwaters. A conspicuous church stands in the town.

No. 6 Lighted Buoy (56°58'N., 10°52'E.), which marks Route B, is moored about 11 miles NE of Svitringen Rende S Light.

No. 7 Lighted Buoy (56°51'N., 10°48'E.), which marks Route B, is moored about 6.5 miles E of Svitringen Rende S Light. This lighted buoy also marks Route C, Route F, and the approach track leading to Limfjorden.

Anchorage.—Vessels, with offshore winds, may anchor in suitable depths, fine sand and stones, anywhere off the coast between Stensnaes and the entrance to Limfjorden. Local knowledge is advised.

Caution.—Fish traps or nets may be encountered within 3 miles of the coast between Stensnaes and Limfjorden, 16 miles SSW.

A local magnetic anomaly is reported to exist in an area lying 5 miles E of Hals Barre Light.

A restricted area, which may best be seen on the chart, lies centered 1.5 miles SSW of Svitringen Rende S Light. Anchoring, fishing, or other seabed activities are prohibited in this area due to the existence of bottom mines.

Limfjorden

8.8 Limfjorden (56°59'N., 10°19'E.), which leads from the Kattegat to the North Sea, is entered, at its E end, about 4 miles ENE of Hals Barre Light. The waterway consists of a series of lakes connected by narrow sounds. It is about 91 miles long and is entered at the W end via the Tyboron Kanal.

The waterway is a principal commercial fjord but, as a link between the North Sea and the Baltic Sea, its importance is reduced by a controlling depth of only 4m. For more information concerning the W entrance of this waterway, see Pub. 192, Sailing Directions (Enroute) North Sea.

Aalborg, a main port, is situated on the S side of the fjord, about 16 miles above the E entrance.

Ice.—With prolonged E winds, which prevail during periods of frost, the bar at E entrance to the fjord is liable to be closed by ice. The entrance is also frequently slow to thaw.

Tide—Currents.—The range of the tide at Aalborg is 0.3m at springs. The tidal currents in the entrance change regularly during calm weather and attain a maximum rate of 2 knots. However, during bad weather, a current, induced by wind conditions, may set in the same direction for a considerable period. Persistent E winds during the spring cause a current to set W while persistent W winds during fall and winter cause a current to set E. Such currents may attain rates up to 4 knots.

Depths—Limitations.—From No. 7 Lighted Buoy (56°51'N., 10°48'E.), the approach route leads W for 6.5 miles through a dredged channel, 240m wide, to the vicinity of Svitringen Rende S Light. It then leads NW for 8 miles, using the white sector of Hals Barre Light, through a dredged channel marked by lighted buoys and lighted beacons.

From a position located about 0.6 mile SE of Hals Barre Light, a dredged channel, 110m wide, leads WNW and NW for about 5 miles into the entrance. This channel leads through the coastal bank and passes over the bar, which lies about 1 mile SE of the entrance and consists of drying shoals.

The entrance channel is dredged to a depth of 10.4m as far as Hals, which is located on the N side of the entrance. The fairway within the fjord is dredged to a depth of 10.1m as far as Aalborg. The controlling depth for approaching Aalborg from W is 4m. Vessels with drafts up to 9.3m can reach Aalborg from the E entrance of the fjord while those approaching from W are limited to a maximum draft of 3.8m.

An alternate approach channel, with a least depth of 4m, leads WSW from a position located 8 miles N of Svitringen Rende S Light. It passes SSE of the shallower parts of Svitringen and joins the main channel about 1 mile SE of Hals Barre Light.

Pilotage.—Pilotage is compulsory from Hals Barre Light to Alborg for vessels with a draft of 6m and over. Exemptions are made for frequent visitors.

Pilots can be contacted by VHF and board in the following positions:

1. Hals 1—Near No. 7 Lighted Buoy (56°51.5'N., 10°46.5'E.).
2. Hals 2—1 mile NW of Svitringen Rende S Light.
3. Hals 3—7 miles NW of Svitringen Rende S Light.

The Limfjorden Pilot Station provides pilots for Aalborg, other ports within the fjord, and other ports on the E coast of Jylland. Deep Sea (Transit) Pilots for The Sound, Store Baelt, and Lille Baelt may also be requested.

The Aalborg and Limfjorden pilot station can be contacted, as follows:

1. VHF:	VHF channels 16, 9 12 13
2. Telephone:	45-99-301500
3. Facsimile:	45-99-301515
4. E-mail:	info@aalgborghavn.dk
5. Website:	http://www.aalborghavn.dk

Pilots for Limfjorden may also be ordered through the Dan-Pilot (Great Belt), Spodsbjerg office. For further information, see Pilotage in paragraph 7.1.

Aspect.—The dredged channels are marked by lighted buoys and lighted beacons. The fairways are indicated by lighted ranges, which may best be seen on the chart.

Mulbjerge (56°55'N., 10°16'E.), a range of bare hills, stands 4 miles S of the entrance and is conspicuous from seaward.

Regulations.—The obligation for an inbound vessel to give way to an outbound vessel only applies in the dredged channel crossing the bar.

Vessels which, by reason of size, must keep strictly to the alignment of the ranges should display the appropriate shapes and lights for vessels constrained by their draft.

Traffic crossing the entrance in the vicinity of Hals must give way to vessels navigating in the main channel.

Anchorage.—An anchorage area, for vessels waiting to enter the fjord, lies centered 1.7 miles SE of Hals Barre Light, adjacent to the N side of the approach channel. It has a dredged depth of 10.4m over a bottom of fine sand.

Caution.—Fish traps or nets may be encountered within 3 miles of the coast on either side of the dredged approach channel.

A submarine cable, which may best be seen on the chart, extends NW from Hals Barre Light to the shore.

Anchorage is prohibited within an area, which may best be seen on the chart, extending across the entrance of the fjord in the vicinity of Hals.

A designated nature reserve area, which may best be seen on the chart, fronts the entrance of the fjord on both sides of the dredged channel and extends up to about 1 mile seaward. Entry into the area is subject to numerous special regulations.

8.9 Hals Havn (56°59'N., 10°19'E.) (World Port Index No. 30380), a small harbor, is situated on the N side of Limfjorden, close inside the entrance. The harbor basin is quayed and has depths of 3 to 4m alongside. A berth, 150m long, is situated outside the basin. It fronts the fjord and has depths of 4 to 7m alongside. Vessels up to 100m in length, 15m beam, and 3.5m draft can be accommodated in the basin.

A local ferry, which berths outside the basin at the W end of the harbor, runs to a pier located at Egensekloster Pynt, at the S

side of the fjord. Egense Lystbadehavn, a yacht harbor, is situated close E of the ferry pier.

A conspicuous church is situated at Hals, about 0.5 mile N of the harbor, and a chimney stands close W of it.

Aalborg (57°03'N., 9°55'E.)

World Port Index No. 30400

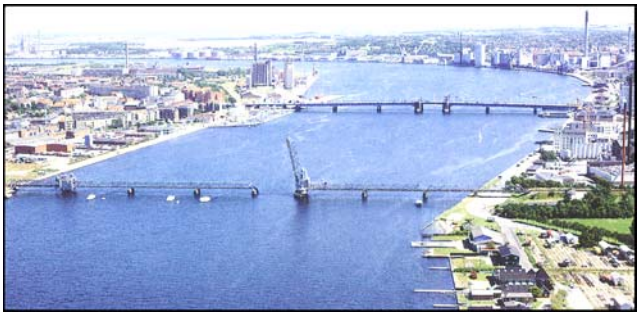
8.10 Aalborg (Alborg), a main port, is situated 16 miles above the E entrance of Limfjorden. It consists of the amalgamated cities of Aalborg, on the S shore, and Norresundby, on the N shore. The facilities include a number of river berths and several harbor basins.

Tides—Currents.—The tidal range is about 0.3m. Winds from W may raise the water level by up to about 1.3m and winds from E may reduce it by as much as 0.9m.

Depth—Limitations.—Two overhead cables, with a vertical clearance of 49.5m, span the channel in the vicinity of Bredhage (57°04'N., 10°02'E.).

The Limfjorden Road Bridge (57°03.3'N., 9°55.2'E.) spans the fjord at the W end of Aalborg and has a central double-bascule section. It has a vertical clearance of 9.5m when closed and provides a navigable passage 30m wide.

The Jernbanebroen Railroad Bridge spans the fjord 0.4 mile NW of the road bridge and is supported on seven piers. A single bascule section, located between the third and fourth piers from the S shore, provides a navigable passage 30m wide.



Aalborg—Bridges from W

A tunnel crosses the fjord at the E end of Aalborg.

The port extends along both sides of the fjord and consists of a number of river berths and several harbor basins. It provides about 4 miles of total quayage, with depths of 5 to 10.1m alongside.

Aalborg Osthavn (57°03'N., 10°03'E.), a bulk terminal, is situated at the SW side of the fjord, about 5 miles E of the city. The quay is 620m long and has a depth of 9.5m alongside.

Gronlandshavn, a private harbor, is situated 0.5 mile SSE of Aalborg Osthavn and consists of a basin and a riverside quay. This harbor handles container and ro-ro vessels. It provides 1,450m of berthage with depths of 8.5 to 9.5m alongside.

Nordjyllandsvaerkets Havn (57°04.4'N., 10°02.3'E.), situated close NW of the overhead cables, serves a power station. It provides a main quay, 341m long, with a depth of 10m alongside.

Several quays, with depths of 4.5 to 9.7m alongside, are situated at Rordal, 2 miles NE of Aalborg, and vessels up to 200m in length can be handled.

Aalborg—Osthavn Bulk Terminal

Aalborg—Gronlandshavn

There are facilities for general cargo, ro-ro, container, tanker, bulk, gas, chemical, and passenger vessels. In addition, there are several basins for fishing vessels, small craft, and pleasure boats.

Vessels up to 102,00 dwt, 257m in length, and 9.3m draft can be accommodated within the port.

Aspect.—The fairway within the fjord is indicated by lighted ranges and marked by lighted buoys. A conspicuous red farm house stands on the N shore at Osteragard, 3.2 miles W of Hals. Two pairs of prominent beacons, marking a conservation area, stand on the S shore about 3 miles WNW of Osteragard. A conspicuous church, with a dark roof, is situated at Vester Hassing, 4.8 miles NW of Osteragard.

The southeasternmost cable spanning the channel at Bredhage (57°04'N., 10°02'E.) is supported by two conspicuous masts, 142m high. A conspicuous group of seven wind generators is situated about 0.8 mile N of the overhead cable. A prominent church, with a dark roof, stands on high ground at Norre Tranders (57°02'N., 9°59'E.).

The facilities extending along the S side of the port are backed by the city of Aalborg while those on the N side are backed by the town of Norresundby. Numerous conspicuous chimneys and silos stand in the vicinity of the quays.

Pilotage.—Pilotage is compulsory for vessels of 80m in length and over when passing through the Jernbanebroen Railroad Bridge. Vessels with a draft of 6m and over shall employ a pilot when navigating between Hals Barre Light and the port.

The pilot boards in the following positions:

1. When passing the Jernbanebroen Railroad Bridge from the E—57°03.1'N, 9°56.7'E

Aalborg—Nordjyllandsvaerkets

Aalborg (South Quays)

2. When passing the Jernbanebroen Railroad Bridge from the W—57°03.7'N, 9°53.1'E.

For information concerning pilotage into Limfjorden, see paragraph 8.8.

Regulations.—The service of tugs is compulsory for vessels over 1,500 dwt when passing through the Limfjorden Road Bridge or the Jernbanebroen Railroad Bridge.

The Jernbanebroen Railroad Bridge opening times are from 0500 to 2100. However, commercial vessels can make arrangements with the bridge watchkeeper to open any time if the request is made before 2000 hours LT.

Aalborg can also be contacted by:

info@aalborghavn.dk

Aalborg Home Page

http://www.aalborghavn.dk

Caution.—A submarine cable area, the limits of which are shown on the chart, lies in the vicinity of the Limfjorden Road Bridge and the Jernbanebroen Railroad Bridge.

Limfjorden to Fornaes

8.11 The coast between Limfjorden and Fornaes, about 39 miles SE, forms the W and S sides of Alborg Bugt, which encompasses Mariager Fjord and Randers Fjord in its SW part.

The entire N section of this coast between Limfjorden and Mariager Fjord, 16.5 miles S, is low and sparsely wooded. Only at Als, located 3 miles N of Mariager Fjord, does the coast rise to a height of 25m before dropping down again. A conspicuous white church stands at Als; windmills are situated close SW of it.

The coastal bank along this stretch, with depths of less than 10m, extends up to about 8 miles seaward and the 5m curve lies about 3.5 miles offshore. Muldbjerg Grund (56°55'N., 10°22'E.), a rocky shoal, lies about 4.5 miles SSE of the entrance to Limfjorden, on the N part of this coastal bank, and has a least depth of 2.2m.

Oster Hurup (56°48'N., 10°17'E.), a small fishing harbor, is situated 6 miles N of Mariager Fjord. This artificial harbor is protected by two moles and connected to the shore by a road embankment, 350m long.

Caution.—Vessels should remain close to the center of the indicated ranges while transiting the approach fairways due to the location of adjacent shoals.

Fish traps or nets may be encountered within 3 miles of the coast between Limfjorden and Mariager Fjord.

8.12 Mariager Fjord (56°42'N., 10°20'E.) extends about 20 miles in a general W direction to Hobro, a small loading port located at its head. Other ports within this fjord include Hadsund, situated on the N shore about 7 miles W of the entrance, and Mariager, situated on the S shore about 6 miles above Hadsund. In addition, there are several small craft and pleasure boat harbors within the fjord.

Tides—Currents.—The tidal range at the entrance to the fjord is about 0.8m at springs and 0.5m at neaps.

Strong winds from NW to NE may raise the water level by up to about 1.5m and strong winds from SE to SW may reduce it by as much as 0.7m.

Outside the entrance to the fjord, the flood current sets S and the ebb current sets N, at rates of up to 2 knots. Inside the entrance bar, the tidal currents set in the direction of the channel at rates of up to 3 knots. During gales, the rate of these currents may increase to 4 knots. The currents turn about 2 hours after HW and LW.

Depths—Limitations.—The entrance to the fjord is fronted by a shoal flat, which extends up to about 5 miles seaward and may best be seen on the chart.

From No. 2 Lighted Buoy (56°41'N., 10°38'E.), which marks Route F, a track leads W for 4 miles to the vicinity of Mariager Fjord Lighted Buoy and then NW for 2.5 miles to Mariager Fjord Rende East Lighted Buoy. It passes SW of the seaward extremity of the N part of the shoal flat, which is marked by buoys, and NE of the S part of the shoal flat.

From Mariager Fjord Rende East Lighted Buoy, a dredged channel leads in a WSW direction for 3 miles across the bar and into the fjord. This dredged channel and the fairway within the fjord have a least depth of 5.7m. Vessels with drafts up to 5.2m can enter.

The fairway within the fjord is divided into two distinct

parts. The E part extending to Dania, located about 10 miles above the entrance, is narrow, winding, and has depths of 5.7 to 14m. The sides are steep-to and the greater part of the water area on either side dries. The W part extending above Dania is deep up to within 2 miles of Hobro, at the head.

The Hadsund Bridge, a fixed bridge, spans the fjord and is supported by seven pillars. A double-bascule section, located between the third and fourth pillars from the N end, provides a navigable passage, 26m wide. For vessels with a deck height exceeding 12m, the passage is reduced to a width of 24.5m.

The Hadsund Bridge

An overhead cable, with a vertical clearance of 36m, spans the fjord about 3 miles from the head.

Aspect.—The land near the entrance to the fjord is low and partly wooded but rises inland. Overgaard Manor House stands on the S side of the fjord about 3 miles WSW of the entrance. This building is prominent and can be easily recognized by its dark spire and the woods in the vicinity.

The dredged entrance channel is indicated by a lighted range and marked by buoys. The fairway within the fjord is indicated by numerous lighted ranges and marked by buoys.

Pilotage.—Pilotage is compulsory for all vessels of 60m in length and over and all vessels with a draft of 3.5m and over. Some exemptions may be made for frequent visitors. Pilots are stationed at Als Odde, on the N side of the entrance. They may be contacted by VHF and board in the vicinity of Mariager Fjord Lighted Buoy (56°41'N., 10°30'E.).

For further information, see Pilotage in paragraph 7.1.

Regulations.—Navigation at night is limited to vessels up to 1,500 dwt, fitted with a search light.

The maximum speed allowed in the dredged channel is 7 knots.

When it appears likely that vessels of moderate size proceeding in opposite directions will meet in one of the dredged channels, the vessel proceeding with the current has the right of way. This regulation applies regardless of whether one or both of the vessels are displaying the privileged vessel signal for navigating in Danish inland waters.

Anchorage.—Vessels waiting to enter the fjord may anchor, in depths of 6 to 7m, fine sand, close E of Mariager Fjord Lighted Buoy (56°41'N., 10°30'E.). Small local vessels may anchor on the sand flat fronting the entrance to the fjord.

Vessels may anchor within the fjord but they must not obstruct the channel or prevent access to the piers.

Caution.—Vessels without local knowledge are advised not to enter the fjord without the services of a pilot.

A restricted area, which may best be seen on the chart, lies centered 2.5 miles E of the fjord entrance on the S side of the dredged channel. Anchoring, fishing, or other seabed activities are prohibited in this area due to the existence of bottom mines.

The E part of the fjord, between the entrance and the bridge at Hadsund, is a designated nature reserve. Entry is subject to numerous special regulations.

8.13 Hadsund Havn (56°43'N., 10°07'E.) (World Port Index No. 30340), a small harbor, is situated on the N side of the fjord close SW of the bridge. It provides several riverside berths. The main berth is 210m long and has a depth of 5.7m alongside. Vessels up to 120m in length, 18m beam, and 5.2m draft can be accommodated.

Dania Cement Terminal (56°41'N., 10°03'E.), situated on the S side of the fjord, consists of berthing facilities at Dania Havn and Kongsdal Havn, close SE. A conspicuous silo stands near the berth at Dania Havn. The main berths have a depth of 5.7m alongside and can accommodate vessels up to 110m in length and 5.2m draft.

HJ Hanson A/S Bro Terminal (56°42'N., 10°03'E.) consists of a pier, 44m long, with a depth of 5m alongside. Vessels up to 80m in length, 12m beam, and 4.8m draft can be handled.

Dansk Salt I/S Anlaegskaj Terminal (56°41'N., 10°02'E.) consists of a private quay, 140m long, with a depth of 5.7m alongside. Vessels up to 100m in length, 13.5m beam, and 5.2m draft can be handled.

Mariager Havn (56°39'N., 9°59'E.) (World Port Index No. 30350) is situated on the S side of the fjord about 3.2 miles above Dania Havn. The commercial facilities consist of a small basin and a quay, with a depth of 5.6m alongside.

Mariager Havn, fronting the largest town in the fjord, is situated at the head. This small harbor consists of a basin with 518m of quay-age and a depth of 5.7m alongside. Vessels up to 130m in length and 5m draft can be accommodated.

8.14 Between Limfjorden and Randers Fjord, 6 miles S, the coast is fronted by a sand flat, with depths of less than 5m, which extends irregularly up to 2.7 miles seaward and may best be seen on the chart.

Boels Rev, a detached shoal patch, lies about 1 mile offshore, 3 miles NE of the entrance to Randers Fjord. It has a least depth of 0.9m and is marked from April to November by a buoy.

Boels Plade (56°38'N., 10°28'E.), a shoal bank with a least depth of 5m, lies centered 5 miles ENE of the entrance to Randers Fjord and should not be crossed in heavy seas.

Hevring Flak, a rocky extension of the coastal bank, fronts the shore about 5 miles SE of the entrance to Randers Fjord. Fjellerup Flak, a small detached bank with a least depth of 5.5m, lies 1.5 miles offshore, about 5 miles E of Hevring Flak.

Tangen (56°36'N., 10°45'E.), an extensive shoal area, lies in the S part of Alborg Bugt, with its W part located about 7 miles E of the entrance to Randers Fjord. The W part of this shoal area has a least depth of 2.8m but is subject to considerable and sudden changes.

The E part of Tangen consists of numerous smaller shoal patches, with depths of 4 to 6m, which may best be seen on the chart. These patches lie up to about 9 miles NW, 6 miles N, and 5 miles NE of Gerrild Light (56°32'N., 10°50'E.).

Numerous wrecks, some dangerous, lie in the vicinity of Tangen and may best be seen on the chart.

Udbyhoj Light (56°35'N., 10°19'E.) is shown from a prominent building, 6m high, standing on Elkaer Bakke, a hill,

which rises to a height of 31m on the S side of the entrance to Randers Fjord.

Udbyhoj Light

8.15 Randers Fjord (56°36'N., 10°20'E.) provides access to Randers Havn, situated 16 miles above the entrance. It leads generally SSW for about 9 miles to Ugelhuse and then W for about 6 miles to Randers. Several small harbors, used only by fishing vessels, local ferries, and pleasure craft, are situated within the fjord.

Tides—Currents.—The tidal range in the fjord entrance is about 0.8m at springs and 0.3m at neaps.

Strong winds from NW to NE may increase the water level in the fjord by up to 1.7m and strong winds from SW to SE may reduce it by as much as 0.7m.

During calm weather, the ebb and flood tidal currents set in the direction of the channel within the fjord. The flood current attains a maximum rate of 2.5 knots; the ebb current attains a maximum rate of 4 knots. Seaward of the fjord entrance, the ebb and flood tidal currents set N and S, respectively. During unsettled weather, irregular tidal currents prevail and they may set in one direction for a longer period of time.

Depths—Limitations.—The fjord may be approached from NE or SE. Vessels approaching from NE may pass either side of Boels Plade (56°38'N., 10°28'E.). Vessels approaching from SE should pass between the S side of Tangen and the coast.

A dredged approach channel, with a bottom width of 30 to 50m, leads WSW for about 2 miles across the bar. This channel and the fairway within the fjord have a controlling depth of 7m. Vessels with drafts up to 5.8m may enter.

The outer part of the fjord is 0.3 to 0.9 mile wide but the depths lying outside the fairway channel are shallow. The inner part is narrow and runs between fields on either side. The fairway within the fjord has a minimum width of 22m.

An overhead cable, with a vertical clearance of 40m, spans the channel 3 miles W of Ugelhuse.

Aspect.—The land in the vicinity of the fjord is low but rises gradually inland, the steeper slopes being on the S side. The entrance to the fjord, in good visibility, may be easily distinguished by the dip between the hills.

An outer approach lighted buoy is moored about 3.5 miles ENE of Udbyhoj Light (56°35'N., 10°19'E.). The approach channel is indicated by a lighted range and marked by buoys. The various channel reaches are marked by beacons and buoys.

In the vicinity of the entrance, prominent churches stand at Sodring, Raby, and Udby, which are situated 2.3 miles N, 3 miles WNW, and 1.2 miles SSW, respectively, of Udbyhoj Light.

Pilotage.—Pilotage is recommended for vessels without local knowledge due to the strong tidal currents and the narrow fairway. Vessels should send an ETA via their agent 24 hours prior to arrival. Pilots can be contacted by VHF and board in the vicinity of the outer approach lighted buoy. For further information, see Pilotage in paragraph 7.1.

Regulations.—Entry at night is restricted to vessels of up to 1,000 dwt provided they are equipped with an approved and powerful searchlight.

Speed limits are in force within the fjord.

Vessels proceeding with the tidal current have the right of way over vessels proceeding against it.

Randers Havn can be contacted by e-mail, as follows:

randershavn@randers.dk

Anchorage.—Vessels waiting to enter the fjord may anchor, in a depth of 8m, fine sand, close E of the outer approach lighted buoy (56°37'N., 10°25'E.).

Caution.—Spoil ground dumping areas, which may best be seen on the chart, lie centered 4.2 miles ENE and 2.1 miles E of Udbyhoj Light.

Submarine cables extend across the fjord in various places and are marked by notice boards.

A ferry crosses the fjord about 6 miles above the entrance.

8.16 Randers Havn (56°27'N., 10°03'E.) (World Port Index No. 30330), a small port, is situated at the mouth of the River Gudena, which flows into the head of Randers Fjord. It remains open all year round. A number of prominent chimneys and silos stand in the vicinity of the harbor.

The harbor consists of two quayed basins, divided by a large pier, which have depths of 6 to 7m alongside.

There are facilities for general cargo and bulk vessels. Vessels up to 145m in length, 20m beam, and 5.8m draft can be accommodated.

Randers Havn

Caution.—A submarine pipeline extends across the fjord,

close E of the pier dividing the two harbor basins.

Depths in the harbor basins may be reduced by silting.

8.17 The coast extending SE for 6 miles from Randers Fjord to Hevring, a village, is low and wooded. A conspicuous red church, with a pointed tower, stands at Estruplund, about 0.3 mile inland, 2.6 miles SE of Udbyhoj Light.

The coast then continues E for about 14 miles to Knudshoved, a grass-covered point. This stretch is mostly flat with a few low hills, but the land behind is high.

Bonnerup Havn (56°32'N., 10°43'E.), a small artificial harbor, is situated 4 miles W of Knudshoved and is used only by fishing vessels and pleasure craft. It is connected to the shore by an embankment. Seven conspicuous wind generators stand in line along the harbor breakwaters.

A conspicuous windmill, without sails, is situated near the shore about 0.3 mile W of Bonnerup Havn.

Mejlgard Manor House, with a red roof and spire, is situated 2.5 miles SW of Bonnerup Havn and is prominent from seaward.

Mejlgard Manor House

Gjerrild Light (56°32'N., 10°50'E.) is shown from a prominent tower, 11m high, standing on Knudshoved.

Gjerrild Light

Prominent churches stand at Glesborg and Rimse, 4.5 miles SW and 3.2 miles SSW, respectively, of Gjerrild Light.

Gjerrild Flak, a shoal flat with depths of less than 6m, fronts the NE side of Knudshoved and extends up to about 1.5 miles seaward.

From Gjerrild Light, the coast extends SE for 6.5 miles to Fornaes and is low, with inland woods. Gerrild Klint, located 1.4 miles SE of the light, and Karby (Sangstrup) Klint, located 2 miles father SSE, are two white cliffs, each about 0.8 mile long, which are prominent from seaward.

Caution.—Hevring Firing Practice Area, marked by buoys, extends about 3 miles seaward from two signal masts, which are situated 4.5 miles and 5.7 miles SE of Udbyhoj Light. When the area is in use, signals are displayed from the masts. By day, a ball is hoisted at each signal mast and a flashing light is shown from the southeasternmost mast. At night, a flashing red and white light is shown from the southeasternmost mast.

Between Gerrild Light and Fornaes, fishing nets, extending up to about 500m from the shore, may be encountered.

Fornaes to Arhus Bugt

8.18 **Fornaes** (56°26'N., 10°58'E.), the E extremity of Jylland, is a broad projecting point. A light is shown from a prominent tower, 27m high, standing on this point. The light is obscured to the NW by Gerrild Klint.

Fornaes

Fornaes Light

No. 4 Lighted Buoy (56°24'N., 11°06'E.) is moored about 5.5 miles ESE of Fornaes Light and marks the junction of Route E, Route A, and Route F.

A conspicuous white church stands at Hammelev, about 2 miles W of Fornaes Light.

A shoal patch, with a depth of 4.2m, lies about 0.3 mile off the S part of Fornaes and 0.7 mile S of the light. It is marked close SE by a buoy.

8.19 Grenaa Havn (56°25'N., 10°55'E.) (World Port Index No. 30290), a small commercial port and ferry terminal, is situated 2 miles SSW of Fornaes Light and is open all year round.

Tides—Currents.—The tidal range is about 0.3m.

The tidal currents along this part of the coast change regularly every 6 hours during good weather. The N setting current is predominant with the S setting current being usually weak. Gale force winds from NW to N may raise the water level by up to 1.1m while gale force winds from SE to S may lower it by as much as 1.2m.

Depths—Limitations.—Kalkgrunden, a rocky reef, lies with its W end located close NE of the harbor entrance and has a least depth of 0.6m. It extends E for about 0.6 mile and is marked by lighted buoys. From a position located 2.5 miles E of Fornaes Light, the main approach channel, 100m wide, leads WSW and passes NNW of this reef.

The harbor is protected by two breakwaters, which form an entrance facing NNE. From a position located about 0.2 mile NNE of the E breakwater head, an entrance channel leads SW into the harbor. The least depth in the entrance channel and outer part of the harbor is 10.1m.

The harbor is divided by a detached mole into two parts, known as Nordhavn and Sydhavn. Basin No. 1 and Basin No. 2 are situated in Sydhavn and have depths of 4.5m.

Basin No. 3, Basin No. 4, and Basin No. 5 form the commercial harbor and are situated in Nordhavn. Basin No. 3 has 320m of quayage and provides four berths, with depths of 6.3 to 6.5m alongside. There is also an oil and gas jetty, 140m long, which provides two berths, with depths of 6.5m alongside.

Basin No. 4 has 570m of quayage and provides five berths, with depths of 7 to 7.2m alongside. Basin No. 5 has one berth, 360m long, with a depth of 10.1m alongside.

The port has facilities for fishing, offshore exploration support, general cargo, bulk, ferry, tanker, ro-ro, and container vessels. Tankers up to 110m in length and 6.2m draft can be accommodated. Cargo vessels up to 180m in length, 25m beam, and 9.5m draft can accommodated.

A small craft harbor, with depths of 2 to 3m, is situated close S of the commercial port and protected by two moles.

Aspect.—Directional sector lights, which may best be seen on the chart, indicate the approach and entrance channels. An outer approach lighted buoy is moored about 1.1 miles SSE of Fornaes Light.

A conspicuous church stands in the town, about 1.8 miles W of the harbor, and a prominent windmill is situated on high ground 0.6 mile NW of it. Several prominent chimneys stand in the vicinity of the harbor.

Pilotage.—Pilots can be contacted by VHF and board, as follows:

1. Grenaa—about 2.7 miles ENE of the harbor entrance.
2. Route A—in the vicinity of No. 4 Lighted Buoy (56°24'N., 11°06'E.) (see Directions in paragraph 7.8).

For further information, see Pilotage in paragraph 7.1.

Grenaa Havn

Grenaa Havn may be contacted by e-mail, as follows:

info@grenaahavn.dk

Caution.—Ferries berthing during strong wind conditions sometimes create excessive propeller wash within the harbor.

Vessels with drafts of over 4m should not approach the E breakwater head from SE within a distance of 80m.

8.20 Between Grenaa Havn and Havknude, a rounded point situated 4.3 miles S, the land is low except near Katholm, located close NNW of Havknude. In contrast to the low land, wooded hills rise in this vicinity.

A conspicuous white church, with a slate roof, stands at Also, about 2.7 miles NW of Havknude.

Havknude Flak (56°21'N., 10°56'E.), consisting of a number of shoal patches with depths of less than 5m, extends about 2 miles seaward from the coast in the vicinity of Havknude and is marked by a buoy.

Rothes Grund, a rocky shoal patch, lies about 0.5 mile offshore, 3.3 miles SSW of Havknude, and has a least depth of 2.3m.

Glatved (56°18'N., 10°52'E.), situated close NW of Rothes Grund, consists of a T-headed pier with a conveyer belt system. The berth is 100m long and has a depth of 5.3m alongside. It can handle small vessels with drafts up to 4.7m. Pilots are provided by the station at Grenaa Havn.

Hassenor (56°08'N., 10°43'E.), a low point, is located 10.7 miles SW of Glatved, at the SE extremity of Jylland. Several shoal patches, with depths of less than 5m, front this stretch of coast and lie up to about 0.5 mile seaward.

Jessens Grund (56°16'N., 10°51'E.), a detached rocky shoal, lies about 1 mile offshore, 2.6 miles SSW of Glatved. It has a least depth of 3.1m and is marked close E by a buoy.

Skelhojsgrunde (56°10'N., 10°47'E.), a detached rocky shoal bank, lies centered 2.6 miles NE of Hassenor. It has a least depth of 5m and is marked at the NW side by a lighted buoy.

Tvillingerne, a rocky shoal bank with a least depth of 4.4m, lies centered about 4.3 miles NE of Hassenor and a detached

shoal patch, with a depth of 5.6m, is located about 1.3 miles N of it.

Klokkegrund (56°08'N., 10°44'E.), a detached shoal patch, lies about 0.8 mile ESE of Hassenore. It has a least depth of 2.8m and is marked close E by a buoy.

A large group of conspicuous buildings stand close S of a high bluff at Kobbergaard, 2.5 miles NNE of Hassenor. Elsegarde, a prominent wooded area, lies 1.3 miles SSW of these buildings.

A conspicuous church is situated at Draby, 4.8 miles N of Hassenor, and Karlsbjerg, a prominent hill, rises to a height of 53m about 0.5 mile SE of it.

8.21 Hjelm (56°08'N., 10°49'E.), a small island, lies 3 miles E of Hassenor. It rises to a bush-covered hill which is conspicuous from seaward. A light is shown from a prominent tower, 18m high, standing on this hill.

Hjelm Light

The SW end of the island is steep-to but the remaining shores are fronted by a coastal bank. Rocky shoals, with depths of less than 5m, lie on this bank. They extend up to 1.2 miles NE and 1.5 miles S of the light and are marked by buoys.

Bjarkesgrund (56°06'N., 10°46'E.), a sandy shoal bank with several rocky patches, lies centered 2.5 miles SSW of Hjelm Light. It has a least depth of 4m and is marked on the NW and SE sides by buoys.

Moselgrund, a sandy shoal bank with several rocky patches, lies centered 3.5 miles SSE of Hjelm Light. It has a least depth of 4.2m and is marked close S by a lighted buoy.

Oreringene (56°07'N., 10°44'E.), a small shoal bank, lies centered 2.8 miles SW of Hjelm Light. It has a least depth of 4.4m and is marked close E by a lighted buoy.

Hjelm Dyb (56°10'N., 10°45'E.), a deep passage, lies between Hjelm and the coast of Jylland.

Directions.—An inshore route, the shortest between the Kattegat and Arhus Bugt, leads through Hjelm Dyb. From a position located on Route A, about 7 miles SE of Grenaa Havn, the track leads SW for 12 miles and passes SE of Havknude Flak and Jessens Grund. Then, from a position located about 4 miles NNW of Hjelm Light, the track continues S through Hjelm Dyb, passing W of Skelhojsgrunde and E of Klokkegrund. At a position located about 1.5 miles E of Hjelm Light, the track leads SSW and passes between Oreringene and Bjarkesgrund. It then continues SSW and joins the route leading W into Arhus Bugt. This route is reported (1998) to have a least depth of 19m, lying about 2 miles SW of Hjelm Light, but elsewhere the depths are much greater.

8.22 Ebeltoft Vig (56°10'N., 10°36'E.), a large bay, is entered between Gaasehage, located 0.8 mile W of Hasssenor, and Sletterhage, 6.5 miles WSW. The town and harbor of Ebeltoft are situated within a bight which indents the E side of the head of the bay. The E and N shores of the bay are mostly low, flat, and sparsely wooded, but the W shore rises rapidly to hilly inland country.

Sletterhage Light (56°06'N., 10°31'E.) is shown from a prominent tower, 16m high, standing on a point of the same name at the SW extremity of Helgenaes, a peninsula forming the SW side of the bay. Draget, a low and narrow isthmus, is located 4.3 miles NNE of the light and connects the N part of the peninsula to the mainland.

Sletterhage Light

A conspicuous church stands 2.3 miles N of the light and Ellemandsbjerg, 99m high, rises 1 mile SSE of it. This hill forms the summit of the peninsula.

Ebeltoft Light (56°14'N., 10°36'E.) is shown from a building, 6m high, standing at the head of the bay.

Ebeltoft Light

A causeway, carrying a pipeline, extends SW from the shore about 0.5 mile E of the light and a pier, 130m long, projects W from its seaward end.

Trehoje, a group of three small peaks, rises to a height of 127m, 3 miles SW of Ebeltoft Light, and is prominent from seaward. A conspicuous windmill stands at Vistoft, 1 mile SW of Trehoje.

A local ferry harbor, protected by two breakwaters, is situated 1.2 miles NW of Gaasehage.

It is reported that a conspicuous group of 16 wind generators stands on a mole which projects 0.4 mile S from the shore about 0.5 mile NW of the ferry harbor.

Oreflak (56°07'N., 10°41'E.), a butterfly-shaped shoal bank, lies centered 1.3 miles S of Gaasehage and has a least depth of 3.6m.

Oreflippen, a detached shoal patch, lies about 2.4 miles S of Gaasehage. It has a least depth of 4.7m and is marked close S by a buoy.

Skadegrund (56°06'N., 10°36'E.), a detached shoal bank composed of sand and stones, lies centered 2.8 miles ENE of Sletterhage Light. It has a least depth of 1.5m and is marked by buoys on the SE and SW sides.

A shoal bank, which extends about 2 miles NW, lies with its SE end located 5.8 miles ESE of Sletterhage Light. It has a least depth of 7.5m and is marked by a lighted buoy moored at the SE end.

A shallow coastal bank fronts the E side of the bay and may best be seen on the chart. It gradually extends seaward between Gaasehage and Alhage, a point located 3.4 miles NW. This bank, which is marked by buoys, has depths of 0.6m lying at its outer edge, about 0.7 mile W and 1 mile NW of Alhage.

Anchorage, with good holding ground, is available anywhere within the bay, clear of the shoals.

Caution.—A restricted area, which may best be seen on the chart, lies centered 5 miles SSW of Gaasehage. Anchoring, fishing, or other seabed activities are prohibited in this area due to the existence of bottom mines.

Sail boat races may take place, between April and November, within an area lying in the NE part of Ebeltoft Vig.

8.23 Ebeltoft Havn (56°12'N., 10°40'E.) (World Port Index No. 30280) fronts the town of Eebeltoft and is used mostly by fishing vessels. It consists of two basins protected by breakwaters. The commercial part of the harbor, known as Trafikhavn, can be approached through a channel which leads E for 2 miles. The fairway is indicated by a lighted range and has a least depth of 4.5m. The harbor entrance faces NW and is 30m wide. Vessels up to 50m long, 10m beam, and 4.3m draft can be accommodated.

A conspicuous church, with a spire, stands in the town. Bogebjerg, a prominent hill, rises about 0.8 mile S of the harbor and is 47m high. Skelhoj, another prominent hill, rises 0.6 mile E of the harbor. It is 61m high; the summit is formed by two hummocks.

Directions.—The main route into the bay leads NNW, using a white sector of Ebeltoft Light, and passes E of Skadegrund. An alternate route leads NNE, using a white sector of Ebeltoft Light, and passes W of Skadegrund.

An approach route from the SE passes SW of Oreflippen and the SW side of Oreflak. It leads NW and joins the main route passing E of Skadegrund. An alternate route leads in a W direction, using a white sector of Hjelm Light astern. It passes S of Klokkegrund and N of Oreflak.

Caution.—A designated nature reserve area fronts the harbor on either side of the approach channel. Entry into this area is subject to numerous special regulations.

Arhus Bugt

8.24 Arhus Bugt (56°03'N., 10°23'E.) is that part of the Kattegat lying W of a line extending between Sletterhage Light (56°06'N., 10°31'E.) and Issehoved, 6 miles SSE. It is bordered on the S side by Tuno Island (55°57'N., 10°26'E.) and the adjacent shallows.

The greater part of Arhus Bugt has general depths of 13 to 18m and provides secure anchorage over a bottom of stiff mud, with a layer of sand in places.

For directions leading into Arhus Bugt, see paragraph 8.29.

Lillegrund (56°03'N., 10°32'E.), a small shoal bank, lies 3 miles S of Sletterhage Light. It has a least depth of 1.3m and is marked close E by a buoy.

Mejlflak (56°03'N., 10°27'E.), a large shoal bank, lies centered 3 miles SSW of Sletterhage Light. It has depths of 0.6 to 4.7m and is marked at the W side by a buoy.

Several shoal patches, with depths of less than 10m, lie between Mejlflak and Sletterhage Light. A lighted buoy, moored about 0.6 mile S of the light, marks the N extremity of these patches.

Wulffs Flak, a small shoal bank, lies about 4.8 miles W of Sletterhage Light. It has a least depth of 6.5m and is marked at the SW side by a buoy.

Begtrup Vig (56°09'N., 10°28'E.), a small bay, lies 4 miles NNW of Sletterhage Light at the NW side of Helgenaes. A number of detached shoal patches, with depths of less than 6m, lie near the middle of its entrance. This bay provides anchorage to small vessels but is of no commercial importance.

Skodshoved (56°12'N., 10°21'E.), a steep promontory, is located 8.2 miles NW of Sletterhage Light and surmounted by a prominent small hill. The coast in this vicinity is flat.

Skodshoved Flak, a sandy flat, extends NNW for about 0.7 mile from the N side of this promontory. It has depths of 0.3 to 0.6m and is marked at the W side by a buoy.

A detached shoal patch, with a least depth of 6.2m, lies about 1.6 miles SW of Skodshoved and is marked close W by a lighted buoy.

Ryes Flak, also known as Vejlby Flak, lies centered 2.7 miles WSW of Skodshoved. This shoal area, a former dumping ground, has a least depth of 2.8m. A detached shoal patch, with a depth of 8.6m, lies about 0.8 mile S of the S end of Ryes Flak and close N of the approach channel leading to Arhus.

Kalvo Vig (56°15'N., 10°25'E.), a sheltered bay, is entered between Skodshoved and Vejlby Hage, 2.2 miles W, and extends about 8 miles NE. Knebel Vig and Egens Vig, two small bays, lie along its E side but are of no commercial significance. The shores of the bay are mainly flat but rise to high and partly-wooded country farther inland. Numerous churches, with prominent spires, stand in the villages which surround the bay.

A tongue of the coastal bank extends up to about 2.5 miles NE of the N side of Skodshoved. It has depths of 1.8 to 5.2m and is marked by buoys at the NW and NE sides.

8.25 Studstrup Havn (56°16'N., 10°20'E.) (World Port

Index No. 30285), a private facility serving a power station, is situated on the W side of Kalvo Vig, 4 miles N of Skodshoved.

The facilities consist of a dredged basin and a quay, 495m long. The entrance channel leads NW and has a least depth of 11.3m. Vessels up to 245m in length, 33m beam, and 11m draft (10m for tankers) can be handled alongside.

Pilotage is compulsory. Pilots can be contacted by VHF and board about 1.5 miles E of Arhus.

A conspicuous chimney stands at the power station. The entrance channel is indicated by a lighted range and marked by lighted buoys. An approach lighted buoy is moored about 0.7 mile SE of the quay.

Regulations.—A prohibited area, in which explosives are dumped, lies centered 1.2 miles NW of Skodshoved. This area, which is marked by buoys, extends across the greater part of the entrance to Kalvo Vig and may best be seen on the chart. Small craft can enter Kalvo Vig on either side of this area but the depths are only 3m or less. A channel for commercial vessels proceeding to Studstrup Havn leads through the E part of the area. Vessels must receive permission from the harbor authorities prior to transiting this channel. It is reported that vessels over 5,000 dwt may pass through the area only during daylight and all vessels must have an underkeel clearance of at least 2m.

Anchorage.—Anchorage, with good holding ground, can be taken throughout most of Kalvo Vig, except in its innermost part.

Arhus (Aarhus) (56°09'N., 10°13'E.)

World Port Index No. 30260

8.26 Arhus, a large commercial port, is situated on the W side of Arhus Bugt, about 10.5 miles WNW of Sletterhage Light. The port complex, which provides about 7.5 miles of quayage, is protected by breakwaters and consists of three main harbor areas, Osthaven, Nordhavn, and Sydhaven.

Arhus

Arhus—Osthavn

Arhus—New container terminal

Arhus—Sydhavn

Tides—Currents.—The tidal range is about 0.3m. Strong winds from W and NW may raise the water level by up to 1m while strong SE winds may lower it by about the same level.

Arhus Aa, a small river, flows into the S end of Nordhavn, causes a slight outward set along the E quays.

Arhus—Entrance to Nordhavn

Depths—Limitations.—The approach channel, which may best be seen on the chart, leads WNW and has a least depth of 14m. The entrance channel leading SW into Osthaven has a least depth of 14m and the entrance channel leading WSW into Nordhaven has a least depth of 11m.

Nordhavn, located in the NW part of the port, consists of Basin No. 1, Basin No. 2, Basin No. 5, and Basin No. 7, which have depths of 7.5 to 11m alongside. The main container quay is 370m long and has a depth of 11m alongside.

Sydhavn is located at the W side of the port and is entered from Nordhavn. It consists of Basin No. 3, Basin No. 4, and Basin No. 6, which have depths of 8 to 10m.

Osthaven is located in the S part of the port. It consists of Basin No. 9, Basin No. 10, Basin No. 11, and Basin No. 12, which have depths of 12 to 14m alongside. The main bulk quay is 450m long and has a depth of 13.5m alongside. The main tanker berth is 250m long and has a depth of 12m alongside. The new container terminal quay is 520m long and has a depth of 14m alongside.

There are facilities for general cargo, ro-ro, ferry, container, bulk, and tanker vessels. Vessels up to 348m in length, 50m beam, and 13m draft can be accommodated in the port. Tankers up to 10.5m draft can be handled. Vessels up to 60,000 dwt fully loaded, and 150,000 dwt partially loaded, can be handled.

Aspect.—An outer approach lighted buoy, equipped with a racon, is moored about 1.7 miles E of the harbor. The approach channel is indicated by lighted ranges, which may best be seen on the chart.

Arhus Cathedral stands at the W side of the harbor and is conspicuous. St. Johannes Church, with a prominent spire, is situated about 0.7 mile N of the cathedral and a conspicuous water tower stands 1 mile NNW of it. Several conspicuous tanks and silos stand in the vicinity of Osthavn.

Pilotage.—Pilotage is compulsory for tankers carrying flammable liquids with a flashpoint below 23°C when arriving or departing. Vessels requiring a harbor pilot must contact the port at least 2 hours prior to arrival, even if a sea pilot is on board. Harbor pilots can be contacted by VHF and board about 1 mile SE of the harbor entrance.

For further information, see Pilotage in paragraph 7.1.

Regulations.—Vessels crossing the channels leading into the harbors must give way to all vessels proceeding through them. Sailboats must give way to vessels in the harbor channels.

Port of Arhus may be also contacted by E-mail:

port@aarhus.dk

Arhus Home Page

http://www.aarhushavn.dk

Anchorage.—Anchorage can be taken, in depths of 12 to 14m, within an area lying centered 1 mile S of the outer approach lighted buoy.

Caution.—An outfall pipeline, which may best be seen on the chart, extends about 1.3 miles E from the S end of the harbor.

It is reported that construction work is being carried out within an area located in the S part of the port, near the container terminal.

Sailboat races may take place, between April and November, within an area fronting the shore close S of the port.

High-speed ferries may be encountered in the approaches to the port.

8.27 The coast extending S for 6 miles from Arhus, at the SW side of Arhus Bugt, is steep and wooded. Marselisborg Castle, a large white building with a flagstaff, stands about 2 miles S of the cathedral at Arhus and is conspicuous from seaward.

Abelshoved (56°06'N., 10°15'E.), located 4 miles SSE of Arhus, is a conspicuous yellow point, 20m high. A prominent radio mast, 213m high, is situated about 1.2 miles WNW of this point. It displays an aeronautical light and stands at an elevation of 317m.

A large yellow warehouse building is situated at Norsminde, 4.2 miles S of Abelshoved, and is prominent from seaward.

Dyngby Hoved (55°58'N., 10°16'E.), a point located 4 miles S of Norsminde, has a conspicuous white church, with a red roof, situated 1 mile NW of it.

Hesbjerg Grund, a coastal bank, extends up to about 1 mile offshore at the N side of the entrance to Norsminde Fjord (56°01'N., 10°16'E.). It has depths of less than 6m and is marked at the E side by a buoy.

Kysing Hage, a spit, extends about 1 mile NE from Kysing Naes, the S entrance point of Norsminde Fjord. It has a least depth of 1.8m and is marked by a buoy.

Norsminde Flak (56°02'N., 10°19'E.), a narrow shoal bank, lies centered 2 miles ENE of the entrance to Norsminde Fjord and parallel to the coast. It has depths of 2.2 to 5.4m and is marked by buoys at the E and W sides.

The coastal bank, with depths of less than 6m, extends up to about 0.5 mile NE of Dyngby Hoved. Dyngby Hage, a detached shoal patch, lies about 0.7 mile ENE of Dyngby Hoved and has a least depth of 5.6m.

8.28 **Tuno Island** (55°57'N., 10°26'E.), a small island, lies 5.5 miles E of Dyngby Hoved. Its summit, 24m high, rises in the SW part. The E and W parts of the island are low. A light is shown from a white church tower, 18m high, standing on the E part of the island. It is reported (1998) that trees surround the church and stand close E of it.

Tuno Light

Tuna Havn, a small harbor, is located at the SE side of the island and protected by two breakwaters. It is used only by local ferries and small craft.

A shoal bank, with depths of less than 10m, surrounds the island and extends up to about 2 miles N and 1.1 miles S of the light. Tuno Ron, a narrow sand spit, extends about 0.6 mile ENE from the E end of the island. Its outer part dries and is marked by a lighted buoy.

Kirkegrund, a small detached shoal bank, lies about 2 miles S of the W end of Tuno. It has a least depth of 3.1m and is marked by a buoy.

Tuno Knob (55°58'N., 10°22'E.), a narrow and above-water sandbank, lies centered about 1.5 miles W of the W end of Tuno Island and on a large shoal bank. The shoal bank extends up to about 0.9 mile N and S of the sand bank. It has depths of 2 to 5m and is marked on the NE and W sides by buoys.

A windfarm area, in which 10 wind generators stand, is located in the vicinity of this shoal bank. The wind generators are floodlit and prominent.

Aschehougs Flak (55°58'N., 10°19'E.), a group of shoal patches, occupies the greater part of the passage lying between the W side of Tuno Knob and Dyngby Hage, 2.6 miles W. These shoal patches have a least depth of 3.4m and may best be seen on the chart.

Caution.—A prohibited area, within which lies a wreck with live ammunition, covers most of the shoal bank surrounding Tuno Knob. It is marked by buoys at the corners and may best be seen on the chart.

8.29 A number of small harbors lie within Arhus Bugt and are used only by fishing vessels, small craft, local ferries, and pleasure boats. The main harbors include the following:

1. Skodshoved Havn (56°11'N., 10°23'E.).
2. Ega Marina (56°12.6'N., 10°17.5'E.).
3. Kalovig Badehavn (56°14.6'N., 10°20.7'E.).
4. Nappedam Lystbadehavn (56°16.7'N., 10°29.7'E.).
5. Norsminde (56°01.4'N., 10°15.8'E.).

Tides—Currents.—The current in Arhus Bugt usually sets N and attains its greatest velocity in that direction but gales from NE, commencing without warning, may cause a strong set in the opposite direction.

The N current sets along the E coast of Jylland as far as Arhus and then sets E towards Mols Hoved (56°10'N., 10°24'E.). It then sets S along the W side of Helgenaes and meets the current flowing N between Sameso and Tuno Island. The united current then sets across the entrance to Ebeltoft Vig and toward Hjelm. The S current sets in the opposite direction as far as a line projecting between Sletterhage Light and Mejlgrund (56°03'N., 10°27'E.). It gradually decreases in velocity to the W of this line but continues in the opposite direction to the N current.

Directions.—The main approach route into Arhus Bugt leads from E in a WNW direction and passes close SSW of Sletterhage Light (56°06'N., 10°31'E.).

An alternate route from S leads in a N direction and passes between Svanegund (55°50'N., 10°25'E.) and Tuno Island (55°57'N., 10°26'E.), on the W side, and the W coast of Samso, on the E side. From a position located about 2 miles NE of Tuno Light, a track leads NE into the Kattegat, passing between Lillegrund (56°03'N., 10°32'E.) and Issehoved Flak (56°01'N., 10°34'E.), while another track leads NW and NNW into Arhus Bugt.

The narrow channels lying W of Tuno Island are used only by coasters and small craft with local knowledge.

Caution.—Restricted areas, which may best be seen on the chart, lie centered 4 miles NNW of Sletterhage Light and 1.8 miles S of Skodshoved. Anchoring, fishing, or other seabed activities are prohibited in these areas due to the existence of bottom mines.

Several submarine cables, which may best be seen on the chart, extend between the SW shore of Arhus Bugt, Tuno Island, and the NW side of Samso.

Arhus Bugt to Lille Baelt and Store Baelt

8.30 The coast between Dyngby Hoved (55°58'N., 10°16'E.) and Bjornsknude, about 17 miles SSW, is indented by several small bights and fronted by an extensive shoal area, on which lie several small islets and islands.

Hov Havn (55°55'N., 10°15'E.), situated 3 miles S of Dyngby Hoved, consists of a yacht basin and a local ferry basin, both protected by breakwaters. The harbor has a controlling depth of 3.7m, but is subject to silting, and can accommodate vessels up to 40m in length and 6m beam. A prominent church stands at Halling, 1.6 miles NW of the harbor.

Hov Ron, a narrow sand bank, lies 0.9 mile SE of Hov Havn and on the S part of a large detached shoal flat, which may best be seen on the chart. The shoal flat, with depths of less than 4m, extends up to about 1 mile N, 1 mile NE, and 0.8 mile SE of Hov Ron. It is marked close N by a lighted buoy and close NE by a buoy.

Hov Lob, a narrow channel, lies about 0.4 mile E of Hov Havn. It is marked by buoys and leads between the coastal bank and the W side of the shoal flat. This channel has a controlling depth of 3.7m and provides access to Hov Havn.

Several detached shoal patches, with depths of less than 10m, lie up to about 4 miles ESE and SE of Hov Havn and may best be seen on the chart.

Kalsenakke (55°50'N., 10°12'E.), a point lying at the S end of Gylling Naes, is situated 5 miles SSW of Hov Havn. The

coast between is flat and partly wooded. A prominent silo stands about 1.7 miles NW of this point.

A shallow coastal bank fronts the shore between Hov Havn and Kalsenakke. It has depths of less than 4m and extends up to about 2 miles seaward.

Sogrund, an extension of the coastal bank, projects SE and its seaward extremity lies about 4.6 miles E of Kalsenakke. This shoal bank has depths of less than 3m and is marked on the S side by a buoy.

Skomagergrund, a shoal flat, lies centered 1.2 miles SW of Kalsenakke, on the coastal bank. It has a least depth of 2.2m and is marked on the SE side by a buoy.

8.31 Svanegrund (55°50'N., 10°25'E.), a large area of drying flats and shoals with depths of less than 5m, lies centered 6.5 mile E of Kalsenakke and may best be seen on the chart. Its W end is joined to the E side of Sogrund. Its E end lies about 10 miles E of Kalsenakke and is marked by a buoy. A narrow spit, with depths of less than 5m, extends NNW for about 1.5 miles from the W end of this area and is marked by a buoy.

Endelave (55°45'N., 10°19'E.), a flat and low island, lies 6 miles SE of Kalsenakke. A prominent church stands in a village on the NW side of the island. A conspicuous wooded grove is situated in the SE corner of the island. A small craft harbor fronts the village and consists of a basin connected to the shore by a stone causeway, 300m long.

A coastal bank, with depths of less than 5m, surrounds the island and may best be seen on the chart. It extends up to about 0.9 mile seaward on the S and E sides, up to about 2 miles seaward on the W side, and up to about 3.2 miles seaward on the NW side. A spit, with depths of less than 2m, extends about 1.7 miles N from the N end of the island. Its extremity, which is marked by a buoy, lies close S of the SE end of Sogrund.

Caution.—Nature reserve areas are situated in the vicinity of the drying flats on Hov Ron and Svanegrund and on the coastal bank extending NW from Endelave.

Several submarine cables extend WNW between the W side of Samso and a point on the shore located close N of Hov Havn. Two submarine cables extend W to the mainland shore from the W end of Endelave.

8.32 Horsens Fjord (55°50'N., 10°05'E.) is entered between Kalsenakke and Hundshage, 4.7 miles WSW, and extends W for about 10 miles. The land on both sides of the fjord rises abruptly to high, wooded hills, but descends gradually to fairly low terrain near the head.

The greater part of the entrance and the fjord is obstructed by a shallow shoal flat, which may best be seen on the chart. Sondergrund, a detached shoal bank, lies about 0.8 mile ESE of Hundshage. It has a least depth of 4.7m and is marked by a buoy.

Hjarno (55°50'N., 10°05'E.), a small island, lies on the shoal flat, 1 mile NNE of Hundshage. A conspicuous church stands near the shore on its SW side. Alro, an island, lies on the shoal flat, 1 mile N of Hjarno, and a prominent church stands near its center. This island is connected to the mainland at its E end by a dam. Both of these islands are low, well built over, and partly wooded.

Borre, a peninsula, extends about 1.2 miles N from the S side of the fjord, 2 miles NW of Hundshage. It is narrow and marked by a bare hummock. Borresknob, an islet, lies close off the N end of this peninsula and is marked by a beacon. Saelgrund, a shallow shoal, extends W for about 1 mile from this islet.

A large conspicuous warehouse stands in the vicinity of Snaptun, about 1 mile NNW of Hundshage. A prominent church is situated on the N shore at Sovind, about 5.5 miles NNW of Hundshage, but is visible only from inside the fjord.

Tides—Currents.—The tidal range is about 0.4m. Under normal conditions, the tidal currents within the fjord change about every 6 hours, setting in the direction of the fairway channel at a rate of about 1 knot. During storms, the currents in the channel leading between the mainland and the islands of Hjarno and Alro may attain rates of 2.5 to 3 knots and may set in the same direction for up to 12 hours. Gales from N to NW may increase the water level in the fjord by up to 1.5m and gales from S to SW may reduce it by as much as 1m.

Depths—Limitations.—Hjarno Sund and Draget form the main entrance channel leading into the fjord. This channel passes close W of Sondergrund and leads in a NW direction between the coastal bank fronting Hundshage and the SW side of Hjarno. Draget is that part of the channel leading NW between the SW end of Alro and the N end of Borre. Depths of 12 to 21m lie within Hjarno Sund and Draget.

From a position located about 0.7 mile NW of the N end of Borre, the channel continues in a SW direction for about 1 mile to the outer entrance of the dredged fairway. The reaches of this channel are indicated by lighted ranges.

The dredged fairway, 32m wide, leads in a W direction for 3.8 miles to the head of the fjord. It is marked by buoys on the N side and has a controlling depth of 6.9m.

Caution.—Several nature reserve areas are situated adjacent to the main channel in Horsens Fjord. Entry into these areas is subject to numerous special regulations.

A number of marine fish farms are situated adjacent to the main channel in Horsens Fjord.

A local ferry runs between Snaptun and the island of Hjarno.

8.33 Horsens (55°52'N., 9°52'E.) (World Port Index No. 30230), an ice-free port, fronts the town at the head of the fjord. The harbor consists of a main commercial basin protected by two short breakwaters. There are also extensive facilities for yachts and fishing vessels.

Depths—Limitations.—The harbor entrance is 65m wide and has a controlling depth of 6.9m. The oil berth is located at the N side of the outer part of the basin; it is 60m long and has a depth of 6.9m alongside. The basin provides about 1,400m of cargo berthage with depths of 4 to 6.9m alongside. There are facilities for general cargo, passenger ferry, bulk, and tanker vessels. Vessels up to 160m in length, 24m beam, and 6.7m draft can be accommodated.

Pilotage.—Pilots for Horsens Fjord may contacted by VHF and board near the buoy marking Lillegrund (55°44'N., 10°08'E.).

For further information, see pilotage in paragraph 7.1.

Regulations.—Vessels in the dredged channel must not exceed a speed of 6 knots when within 2 miles of the harbor entrance.

Prior to departure from the harbor, vessels must confirm that there is not a large inbound vessel in the dredged channel.

Horsens

Port of Horsens may be contacted by e-mail, as follows:

hhsl@horsens.dk

Horsens Home Page

http://www.horsenshavn.dk

8.34 As Hoved (55°45'N., 10°04'E.), a wooded point, projects E from the coast, 3.5 miles S of Hundshage, the S entrance point of Horsens Fjord. Its seaward end is faced by a prominent low, yellow cliff. The buildings of Palsgard Manor stand about 1.6 miles W of the E extremity of the point and are prominent from seaward.

As Hoved Flak, a coastal shoal bank, extends up to about 0.6 mile E of the seaward end of As Hoved. It has depths of 0.6 to 6m and is marked close E by a buoy.

Lillegrund (55°44'N., 10°08'E.), a small shoal bank, lies centered about 2.1 miles ESE of the E end of As Hoved. It has a least depth of 5.3m and is marked at the SW side by a buoy.

Middelflak, a shoal patch, lies 1.3 mile N of Lillegrund and has a least depth of 4.3m.

As Vig and Sandbjerg Vig, two small bays, lie N and S, respectively, of As Hoved. A prominent church stands near the shore at the SW side of As Vig.

Juelsminde (55°43'N., 10°01'E.), a small harbor and marina, is situated on the S side of Sandbjerg Vig. The main basin has depths of 2 to 5m and can accommodate vessels up to 120m in length, 20m beam, and 4.5m draft. The harbor is used by local ferry vessels and pleasure craft. The Lille Baelt pilot station is situated in the harbor and provides pilots for Horsens Fjord (55°50'N., 10°05'E.) and Vejle Fjord (55°40'N., 9°54'E.).

The conspicuous building of a sanatorium stands near the coast close S of the village of Juelsminde.

Bjornsknude (55°42'N., 10°02'E.), a wooded point, is located 3.5 miles SW of the E end of As Hoved. Bjornsknude Flak, a large shoal flat with depths of 0.9 to 4.3m, fronts the shore N of this point and extends up to about 1.5 miles seaward.

Bjornsknude Rev, a sandy spit, extends about 1.5 miles SE from the point. It has depths of 0.9 to 5m and is marked at the SE extremity by a buoy.

Anchorage.—Vessels may anchor, in depths of 8 to 12m, fine sand, in Sandbjerg Vig and off the N side of Bjornsknude Flak.

Directions.—The approach route leading to Horsens Fjord passes between As Hoved Flak and Lillegrund. It leads NNW and is indicated by a lighted range situated on Hjarne.

Caution.—Marine fish farms may be situated close off the shores of As Vig.

Note.—For a description of the waters lying in the approaches to Lille Baelt, W and S of Bjornsknude (55°42'N., 10°02'E.), see Sector 3 of Pub. 194, Sailing Directions (Enroute) Baltic Sea (Southern Part).

8.35 Samso (55°52'N., 10°38'E.), a large island, is generally hilly and almost devoid of woods except for a small area located near its SE corner. Its S coast is low. The island consists of two distinct parts. Nordby Land, a peninsula, forms the N and smaller part. It is connected to the larger S part by Nordby Hede (55°55'N., 10°37'E.), a narrow isthmus.

A number of small and shallow harbors are situated along the shores of the island and are used only by small craft, pleasure boats, local passenger ferries, and fishing vessels. These harbors include Langor Havn (55°55'N., 10°38'E.) and Ballen Havn (55°49'N., 10°39'E.), on the E side, and Marup Havn (55°56'N., 10°33'E.) and Saelvig Mole (55°52'N., 10°33'E.), on the W side.

Issehoved (56°00'N., 10°34'E.), the N extremity of the island, lies about 6 mile SSE of Sletterhage Light (56°06'N., 10°31'E.) and is a low point. Issehoved Rev, a partly drying reef, extends up to about 0.8 mile N of this point and is marked by a buoy.

Issehoved Flak (56°01'N., 10°34'E.), a coastal bank, extends up to about 1.6 miles NNE of Issehoved. It has depths of less than 5m and is marked close N by a buoy.

Klepperne, a rocky shoal patch, lies on the NE part of Issehoved Flak and about 1.8 miles NE of Issehoved. It has a least depth of 2.2m and is marked close NE by a buoy.

8.36 Samso—West side.—The W coast of Nordby Land, the N part of the island, extends 2 miles SW from Issehoved to Kolsore Hage and then 2.6 miles S to Asmindor Hage. With the exception of Issehoved, this part of the coast is hilly. A prominent lookout tower stands, at an elevation of 64m, on Ballebjerg, 0.6 mile SSE of Kolsore Hage. A conspicuous church, with a red roof, is situated at Norby, about 1 mile NE of Asmindor Hage.

Between Asmindor Hage and Saelvig Mole, 4.3 miles S, the coast recedes to form a bay with general depths of 8 to 13m and low shores. The NE part of this bay is known as Maarup Vig and the SE part is known as Saelvig.

A conspicuous radio mast stands about 0.5 mile SSW of Saelvig Mole. Ringebjerge rises close to the coast and about 0.7 mile SW of Saelvig Mole. It consists of two hills, 25m high.

Ringebjerge Sand (55°52'N., 10°31'E.), an extension of the coastal bank, projects up to about 1.8 miles W and NW from the shore in the vicinity of Saelvig Mole. This bank has depths of 1 to 6m and is marked at the W side by a lighted buoy.

Between Ringebjerge and Vesborg Light, about 5 miles S,

the coast consists of a series of bluffs and low shores. Several conspicuous churches stand along this stretch of land.

Dyret, a prominent dome-shaped hill, rises 1.4 miles SSE of Saelvig Mole. It is 51m high and visible from all directions.

Kolby Kaas (55°48'N., 10°32'E.), a small private harbor, lies 1.8 miles NNW of Vestborg Light and is used by an automobile ferry. The entrance, which is protected by two breakwaters, faces WNW and has a controlling depth of 5.2m. The entrance channel is indicated by a lighted range. The two harbor basins have depths of 2.5 to 5.2m alongside. The tidal range is about 0.6m.

A conspicuous white church, with a red roof, stands about 1 mile ENE of the harbor and a prominent windmill is situated 0.5 mile W of it

Vesborg Light (55°46'N., 10°33'E.) is shown from a prominent tower, 19m high, standing on the SW extremity of Samso.

Vestborg Light

Caution.—A restricted area, which may best be seen on the chart, extends seaward for about 0.6 mile in the vicinity of Vesborg Light. Anchoring, fishing, or other seabed activities are prohibited in this area due to the existence of bottom mines.

8.37 Samso—East side.—The coast between Issehoved and the town of Nordby, about 2 miles S, is high. It then decreases in height for 2.5 miles toward Nordby Hede, the isthmus. Bylykke Skaar, a conspicuous cleft in the coast, is located 1.6 miles S of Issehoved.

Nordby Bugt (55°57'N., 10°37'E.), a bay, lies between Issehoved and the shoal areas extending N and NE from the entrance to Stavns Fjord. It is reported that a mooring buoy, used by fishing vessels, is located within this bay.

Stavns Fjord (55°54'N., 10°39'E.) is entered about 5.5 miles SE of Issehoved and extends 3 miles S. It is obstructed by numerous islets, rocks, and shoals. This fjord, which may best be seen on the chart, is mostly very shallow and has no commercial significance.

Besser Rev (55°54'N., 10°41'E.), a very narrow spit, extends 2.5 miles N and forms the E side of the fjord. The entrance lies between Havnehage, the N extremity of this spit, and Lilleore, 0.8 mile W. A shoal bank, with depths of 0.6 to 3m, extends up to about 1 mile N of the entrance and is marked on the N side by a buoy. A buoyed channel, with a controlling depth of 3.5m, leads into the fjord through the W side of the shoal bank.

The coastal bank, with depths of 1 to 5m, fronts the E side of Besser Rev and extends up to about 1 mile seaward in places.

Lindholm Flak (55°56'N., 10°42'E.), a large rocky shoal flat, lies centered 1.2 miles ENE of Havnehage, the N extremity of Besser Rev. It has depths of 1 to 4m and is marked by buoys. Kyholm, located 0.5 mile N of Havnehage, and Lindholm, located 0.7 mile ENE of Havnehage, are two islets which lie on this shoal flat.

Lindholm Sund (55°55'N., 10°41'E.), a narrow channel, leads in a NW direction between Havnehage and the adjacent coastal bank, on the S side, and the SW side of Lindholm Flak, on the N side. It is marked by buoys and has depths of 4 to 11m. The N end of this channel is known as Kyholm Lob and the S end is known as Lindhom Lob. Local knowledge is required.

Between Havnehage, the N extremity of Besser Rev, and Lushage Light, 9.5 miles SSW, the coast is low except at two places. Staalhoj Hage, 20m high, is a point located about 4 miles S of Havnehage and Vorres Hage, 17m high, is a point located 1.3 miles N of Lushage Light.

A conspicuous church stands at Besser, about 2 miles SW of Staalhoj Hage, and a prominent windmill is situated at Kolhoj, 2.4 miles NNW of Vorres Hage.

Caution.—Lindholm Sund and Stavns Fjord lie within a designated nature reserve area and entry is subject to numerous special regulations and restrictions.

A wreck, with a depth of 14.4m, lies about 2.5 miles E of Lushage Light.

8.38 Samso—South side.—Lushage Light (55°46'N., 10°37'E.) is shown from a framework mast, 7m high, standing on Lushage, the SE extremity of Samso.

The S end of Samso between Lushage Light and Vesborg Light, 2.4 miles W, is generally low and has two yellow cliffs in its middle part. A conspicuous house stands at Brattingsborg, about 1.6 miles NW of Lushage Light.

Paludans Flak (55°44'N., 10°34'E.), a large shoal area, lies centered about 2.5 miles S of Vesborg Light. It has depths of 4.1 to 9.7m and is marked by a lighted buoy. A narrow channel leads between the N side of this shoal area and the coastal bank fronting the S side of Samso.

A number of detached shoal patches lie between the S coast of Samso and Fyns Hoved (55°37'N., 10°35'E.), about 8.5 miles S. They have depths of 5.6 to 9.5m and may best be seen on the chart.

A wind farm area, in which 10 prominent wind generators stand, is located off the S side of Samso, about 2.7 miles SSW of Lushage Light.

Directions.—A new Deep Water Route, situated about 6 miles S of Lushage Light, leads W and SW through the dangers and into the approach to Lille Baelt. The fairway channel is marked by buoys and has a least depth of 15.7m.

Note.—For information concerning the waters lying S and E of Lushage Light, see Sector 2 of Pub. 194, Sailing Directions (Enroute) Baltic Sea (Southern Part).

8.39 Samso Baelt (55°54'N., 10°51'E.) is the area forming the N approach to the Store Baelt. It is bordered on the W side by the shoal banks fronting the E side of Samso and on the E side by the waters lying between Sjaellands Rev Light (56°05'N., 11°13'E.) and Rosnaes Light (55°45'N., 10°52'E.).

Samso E Flak (55°57'N., 10°50'E.) is the collective name for the group of dangers lying off the E side of Samso.

Vejro (55°57'N., 10°46'E.), 15m high, is a flat bush-covered islet lying on a shoal bank, about 7.5 miles ESE of Issehoved, the N extremity of Samso. This islet, which is marked by a beacon on its N side, has a conspicuous yellow bluff on the S side. Vejro NW Rev, a coastal bank, extends about 0.5 mile W and 0.6 mile NW from the W end of the islet. It has depths of 1 to 6m and is marked by a buoy.

Vejro Flak (55°58'N., 10°46'E.), a large shoal bank with depths of less than 5m, lies centered 1.8 miles NNE of Vejro and is marked by buoys. Flensborg Grund, a shoal patch with a least depth of 2.6m, lies on the NE part of this bank.

Langballe Grund, a detached shoal patch with a least depth of 5.6m, lies about 2.4 miles NW of the W end of Vejro.

Bosserne (55°56'N., 10°47'E.), consisting of two narrow islets, lies 0.7 mile SE of Vejro and on the W part of Bosser Flak, a large, shallow shoal bank.

Vejro Sund (55°56'N., 10°46'E.), a narrow and comparatively-deep passage, leads SSW between the W side of Bosser Flak and Vejro.

Lindholm Dyb (55°56'N., 10°45'E.), the main passage leading through Samso E Flak, has a least depth of 8.4m. It leads NW between the SW side of Vejro and the NE side of Lindholm Flak.

Marthe Flak (56°02'N., 10°52'E.), a large shoal bank, lies centered about 10 miles E of Issehoved, the N extremity of Samso. A rocky patch, with a depth of 8.8m, lies on the N part of this bank and is marked close N by a buoy. A rocky patch, with a depth of 6.2m, lies on the S part of this bank and is marked close S by a buoy.

8.40 Moselgrund (56°04'N., 10°50'E.), a large shoal bank with several rocky patches, lies about 3 miles N of Marthe Flak and is centered 3.5 miles SSE of Helm Light (56°08'N., 10°49'E.). It has a least depth of 4.2m and is marked close S by a lighted buoy.

Yderflak Light (56°04'N., 11°01'E.) is shown from a prominent tower, 8m high, standing on a shoal of the same name. The shoal has a least depth of 8.3m and is centered 6.5 miles WSW of Sjaellands Rev N Light (56°06'N., 11°12'E.).

Directions.—From a position located E of Yderflak Light, on Route A or Route T, a track leads WSW for about 3 miles and passes SSE of Yderflak Shoal. It then leads in a W direction and passes between the S side of Moselgrund and the N side of Marthe Flak. An alternative track leads SW from Route A. It passes NW of Yderflak Light and then leads W to join the main track. The main track continues W and WNW toward Sletterhage Light (56°06'N., 10°31'E.).

Caution.—A small restricted area lies centered 4.2 miles SSE of Yderflak Light. Another restricted area lies 0.7 mile N of Yderflak Light. It is 1 mile wide and extends W for about 10 miles. Anchoring, fishing, or other seabed activities are prohibited in these areas, which may best be seen on the chart, due to the existence of bottom mines.

A large designated nature reserve area extends about 7 miles seaward from the E side of Samso and covers the greater part of Samso E Rev, including Lindholm Dyb and Vejro Sund. Entry is subject to numerous special regulations and restrictions.

8.41 Hatter Barn (55°53'N., 10°51'E.), a detached shoal bank, lies centered 10.5 miles NE of Lushage Light, and has a least depth of 4.7m. A light is shown from a prominent beacon, 9m high and marked DW6, standing on the NE side of this shoal bank.

Hatter Rev (55°54'N., 10°50'E.), a sandy shoal bank, lies centered 1.3 miles N of Hatter Barn Light and close S of the S end of Bosser Flak. It partly dries in places. A light, equipped with a racon, is shown from a prominent beacon, 9m high and marked DW3, standing at the SE extremity of this shoal bank.

Middelflak (55°56'N., 10°55'E.), a rocky shoal bank, lies centered 2.7 miles NE of Hatter Rev Light and depths of 4.7 to 8m. Munke Grunde, another rocky shoal bank, lies centered about 1 mile N of Middelflak and has a least depth of 4.4m.

No. 16 Lighted Buoy (55°55'N., 10°57'E.), equipped with a racon, is moored about 3.2 miles NE of Hatter Rev Light and marks Route T.

Directions.—From a position located 4.8 miles SSE of Yderflak Light, on Route T, a track leads W for 7 miles and passes N of Middelflak and S of Marthe Flak. It then leads WNW toward Sletterhage Light (56°06'N., 10°31'E.).

Route T divides in the vicinity of No. 16 Lighted Buoy (55°55'N., 10°57'E.). A Traffic Separation Scheme (TSS) leads 7.5 miles SW and passes SE of Hatter Barn. A Deep Water Route leads 5 miles WSW and then 3.5 miles S to No. 20 Lighted Buoy (55°49'N., 10°49'E.). It passes between the S side of Hatter Rev and the N side of Hatter Barn.

From No. 20 Lighted Buoy, Route T continues S for 4.5 miles into the Store Baelt and passes about 1.3 miles W of Rosnaes Puller Light (55°45'N., 10°51'E.).

For a full description of Route T, see paragraph 7.8.

For information concerning the Store Baelt and the waters lying S of Rosnaes Puller Light, see Sector 2 of Pub. 194, Sailing Directions (Enroute) Baltic Sea (Southern Part).

Danish

DANISH — English

A

aa — rivulet
anlaegsbro — pier

B

baek — brook
baelte — band
bake — beacon
bakke — hill
banke — bank
bjerg — mountain
borg — castle, fortified place
bredning — wide place in channel
bro — pier
brygge — quay, wharf
bugt — bay, bight
bundgarn — seine net
by — town

D

dal, dale — valley, gorge
drag — isthmus
dyb — deep
dybde — depth

F

farvand, farvandet — fairway
fjord — fjord
flak — flat
flogetonde — whistle buoy
fyr — light

G

gab — mouth
gammel — old
gittermast — framework beacon
grat — gray
gron — green
grund — shoal area

H

hage — shoal, spit
hale — spit, peninsula
havn — harbor
hoj — hill, point
holm — island
hoved — point, headland
huk — point
hus — house
hvidt — white

I

inder — inner

DANISH — English

K

kalv — detached islet
kanal — canal
klev — cliff
klint — cliff, bluff
klit — sand dunes
knold — knoll, shoal
knude — point
kysten — coast

L

lang — long
lille — little
lob — channel
lods — pilot
lyd — sound
lys — light

M

middelgrund — middle ground
minde — mouth
molle — mill
munding — outlet

N

naeb — point
naes — point, cape, peninsula
nakke — point, cape, bluff
nor — shallow inlet, basin
nord — north
ny — new

O

o — island
odde — point, peninsula, cape
ore — shoal, point, peninsula
ostersoen — the baltic
ostre — east

P

plade — shoal
pulle — shoal
pynt — point, peninsula

R

red — roadstead
redningstatien — lifesaving station
rende — channel
rev — reef, sand flat
revle — reef, shoal
rod — red
ron — rocky ledge

DANISH	English
S	
sand	shoal, sand flat, beach
sandhage	shoal
skance	fort
skov, skoven	forest
slot	castle
sluse	lock
snaevrinjen	the narrows
so, soen	lake, lagoon
sojord	sand flat
spids	point
steil	steep
store	big, great
strom	current
sund	sound
syd	south
T	
tage	fog
tange	tongue of land
tarn	tower
V	
vest	west
vig	bay, inlet, bight, cove
vrag	wreck
Y	
yder	outer

Norwegian

NORWEGIAN	English
A	
a, aa	stream, rivulet
aksel	shoulder of a hill or mountain
ankerplass	anchorage
as	ridge, hill
austre	eastern
B	
bad, bat	boat
bae	rock (generally submerged)
bae i vannflaten	rock, awash at low water
bake	beacon
bakke	hill
bekk	stream
berg, bierg, bjerg	mount, hill
boe	rock (generally submerged)
borg	castle, mansion
boye	buoy
brat	rock (usually a group)
bratt	steep, cliffy, abrupt
bre	glacier
bru	bridge
brygga, brygge	wharf
butkt, bukta,	bay, light, cove
by	town, village
D	
dal	valley
djup	deep
dor, dora	door, gate, passage
dyb, dyp	deep
dykdalb	dolphin
dypgaende	draft of vessel
E	
ebbe	ebb tide
egga	headland, hill, peak, ridge
eid	isthmus
elv, elva	river
F	
fall	fall of a rock or cliff
fartoy, fartyg	vessel
farvann	channel, fairway
favn	fathom
ferje	ferry
festning	fort, fortress
fiskevaer	fishing station
fjaere	ebb tide
fjell	hill, mountain, rocky bottom
fjellrygg	mountain ridge
fjord	firth, arm of the sea
flak	flat or bank

NORWEGIAN	English
flesa	rock (generally above water)
flo	flood tide
flu, flua	rock (submerged)
forberg	promontory
fyr	light
fyrskip	light ship
fyrtarn	light tower
G	
gamle, gammel	old
gap, gat	mouth, channel, deep
gard	farm, village
grund, grunn	shoal
H	
hake	strip or hook of low land
hals	isthmus, neck
halvoy	peninsula
hamn	harbor, haven
haug	hillock, peak, spur
hav	sea
havet	bay, sound
havn	harbor, haven
hei, heia	hill, mountain, peak
hode	head
holm	island
horn	hill, peak
hoy, hogd	hill, hummock
huk	point
hus	house
hvit, hvitt	white
I	
i land	ashore
indre, inre, inste	inner
innsjo	lake
isbre	glacier
J	
jernbane	railway
jokel	glacier
K	
kai	quay
kalv	calf, a small rock near a larger one
kamman	mountain
kampen	peak, hill, mountain
kanal	navigation canal
kapp	cape, point
kilen	cove, fjord, lake
klippe	reef, pinnacle
klumpen	mountain, peak, hill
knaus	crag, rock
kreppa, kreppen	narrows
kyst	coast

NORWEGIAN English

L

ladested ..... loading place
lagen ..... stream, lake
langgrunn ..... shelving bottom, either from a shoal or the shore, which may be shallow water to be avoided or an anchorage to be used
led, leia ..... channel
lille, litle ..... little
lods, los ..... pilot
lop ..... channel, passage
lykt ..... light

M

merke ..... mark
midt, midtre ..... middle
molle ..... mill
munn, munning ..... mouth
myr ..... marsh

N

naering ..... high entrance point of a fjord
nakke ..... neck
nebb ..... peak
nes ..... point, hill, peninsula
nord, nordre ..... north, northern
nos ..... peak, mountain
nut ..... mountain, peak
ny, nytt ..... new

O

o ..... island
odden ..... point, headland, peninsula
oen ..... island
os ..... river mouth, outlet
ost, ostre ..... east, eastern
overettlinjen ..... range line
oy, oya ..... island
oygard, oygruppe ..... archipelago
oyra ..... delta

P

pa ..... at, on
pa grunn ..... aground
pigg ..... peak
pir ..... pier
plata ..... plateau
pollen ..... bay, fjord, cove, lake
pynten ..... point, headland

R

rabben ..... mountain, hill, ridge
rak ..... strait
rasa ..... marine channel
red ..... roadstead
renna ..... channel
rev ..... reef
rod ..... red

NORWEGIAN English

ros, roys ..... stone heap, rocky ground
ryggen ..... spur, ridge, hill

S

salen ..... mountain, peak, gap
sand ..... shoal
sata ..... peak, mountain
sjo ..... lake
skar ..... rocky outcrop
skjaer, skjer ..... rock above water, skerry
skjaergard ..... archipelago, skerries
skogen ..... woods
skolten ..... peak
skorstein ..... chimney
sletta ..... plain, icefield
slua ..... rock
smal ..... narrow
sore ..... south
steinen ..... island, rock, shoal
stor, store ..... large
strand ..... beach
straumen ..... channel, bay, narrows
stretet ..... strait
stommen ..... narrows
sund ..... channel, cove, sound
syd ..... south

T

tangen ..... point, spur, peninsula, spit
taren ..... rock in water
tind ..... mountain, peak, headland
topp ..... summit
torrfall, torrflu ..... drying bank, drying rock
tuen ..... hill
tunga ..... peak, mountain, hill
tuva ..... peak, mountain, hill

U

uklar ..... foul
ur ..... rock falls
utlop ..... mouth, outlet

V

vaer ..... islands
vaet ..... channel
vag ..... fjord, cove, bay
vagan ..... bay
val ..... coast, very shallow cove
varde ..... hill, peak
veggen ..... cliff, ridge
vest ..... west
vik, vika, viki ..... bay, cove, creek, inlet
vrak ..... wreck

Y

ytre, ytste, yttre ..... outer

Swedish

SWEDISH	English
A	
a, alv, alven	stream, river
ankarplats	anchorage
ankarsattning	roadstead, anchorage
arna, arne	group of islands or rocks
as	ridge
B	
back	brook
backe	hill
badan, bade, baden	reef, rock
bak	beacon
bank	bank
barrskog	coniferous woods
bassang	basin
bat	boat
berg, berget	mountain, hill
bergspets	peak, summit
block	boulders
boj	buoy
borg	castle, fort
branning	rock awash
branningar	breakers
brant	steep, precipitous
bredning	wide place in river or channel
bro	bridge
brottsjo	breakers
brygga	jetty, wharf
bukt, bukten	bight, bay
by	town
D	
dal	valley
dammar	weirs
djup, djupet	channel, sound
djupranna	deep channel
domkyrk	cathedral
dy	mud
dykdalb	dolphin
E	
ebb	ebb
elv	river
ensamt	isolated rock
enslingje	range line
F	
fabrik	factory
fabriksskorten	chimney
famn	fathom
farja	ferry
fartprovsbana	measured distance
farvatten, farled	fairway
fastning	fortress
fiskegarn	fish trap
fiskehamn	fishing harbor
fiskelage	fishing village
fiskevatten	fisheries
fjall	mountain, hill
fjard, fjarden	fjord, bay, inlet, lake, sound, channel, strait
fjord, fjorden	fjord
flack, flak	flat, shoal
flat	flat
flod	flood, river
flyg	aeronautical
flytdocka	floating dock
forbjuden	prohibited
forbjudet omrade	prohibited area
forhalningsboj	mooring buoy
forstord	destroyed
fortojningsring	mooring ring
fot	foot
frarntradante	conspicuous, prominent
fyr	light
fyrhus	lighthouse
fyrskepp	lightship
fyrtorn	light tower
G	
gammal, gamla	old
gap	opening, inlet, passage
gard	farm, country place
gatt	opening, entrance
grans	boundary, limit
gron	green
grund, grundet	shoal
grundklack	shoal head
grus	gavel
gul	yellow
H	
hak, hake	hook (of land), pointed shoal
hal	hole, mouth
hals	neck (of land)
halvo, halvon	peninsula
hammar	conspicuous point
hamn	anchorage, bay, harbor
handelshamn	commercial harbor
hav	bay, sea, ocean
havsbukt	gulf
hog	height, hill
hogslat	tableland
hogvatten	high water
hojd	hill
holm, holme, holmen	island
hus	house
hufvud, huvud	cape, head

SWEDISH	English
I	
inlopp	entrance
innerst	innermost
inre	inner
insegling	entrance
insjo	lake
is	ice
issignaler	ice signals
J	
jarnvag	railroad
K	
kabellangd	cable length
kaidam	pier
kaj	quay, wharf
kalv	small islet near a larger one, calf
kanal	canal
kap	cape
karantan	quarantine
kase	beacon
klabbe	bare rocky islet close inshore
klack	underwater head
klapper	pebbles
klint	summit of a steep hill or cliff
klippa	cliff, rock above water
klippgrund	rock, rocky
klockboj	bell buoy
kobb	islet, rock
koping	market town, district
krigshamn	war harbor
kulle	hill
kummel	landmark, cairn
kust	coast
kustvakt	coast guard
kvarn	mill
kyrka	church
L	
landningstrappa	landing stage
landtunga	spit of land, neck of land
lasarett	hospital
lastageplats	loading place
lastbrygga	cargo jetty, pier
lag	low
lage	station, berth
lagvatten	low water
led	channel
lera	clay
lill, lilla	little
livraddningsstation	lifesaving station
ljudboj	whistle buoy
ljudpipa	whistle
lod	lead
lopp	channel
lots	pilots
lotsstation	pilot station

SWEDISH	English
lund	grove
lusthus	summerhouse
lysboj	light buoy
M	
mad	marsh, stretch of water with flat bottom
magasin	storehouse, warehouse
marke	mark
medlerst, mellerst	central
mellan	between, middle
minerada omradet	mined area
missvisning	variation
mol	mill
molo	mole
mudder	mud
muddrad	dredged
mun	mouth
mynning	river mouth, estuary
N	
nabb	nose, point
nas	cape, point
nedre	lower
nodhamn	refuge harbor
nord, norr	north
nordost	northeast
nordvast, nordvest	northwest
norra, nordlig	northern
ny	new
O	
oar, oarna	islands
o, on	island
ogrupp	island group
oklar	foul
oljecistern	oil tank
oljeledning	oil pipeline
oljehamn	oil harbor
omrade	district, ground
oresund	the sound
orlogsvarv	naval shipyard
ost, oster	east
ostersjon	the baltic
ostra, ostlig	eastern
overskoljte	submerged
ovre	upper
P	
pir	pier
platt	flat
plattboj	can buoy
prick	spar buoy
R	
raddningsstation	lifesaving station
radiofyr	radiobeacon
ranna	channel
redd	roadstead

SWEDISH	English
rev	reef, spit, bank
rod	red
ros, rose	cairn, heap of stones
rott	red

S

samhalle	settlement
sand	sand
sjo	sea
sjogras	seagrass
sjomarke	seamark
sjukhus	hospital
skal	shells
skans	fort, redoubt
skar	above-water rock, rocky islet
skargard	fringing rocks, islets, and shoals
skog	woods
skogbevaxt	wooded
skorsten	chimney
skrent	slope, bluff
skyddsomrade	protection area
slatprick	plain spar buoy
slick	ooze
slip	marine railway
slott	castle
sluss	lock
sma	small
soder, sodre, syd	south
sodra, sydlig	southern
spets	point
spetsboj	conical buoy
spir	spire
spirboj	spar buoy
stad	town
stang	pole, spar
stangda farvatter	closed waters
stangmark	pole beacon
sten	stone
stor, stora	great or large
strand	beach
strom	current
sund, sundet	sound

SWEDISH	English
svart	black
syd, sodre	south
sydost	southeast
sydvast, sydvest	southwest

T

tavla	board daymark
tidssignal	time signal
tidvatten	tide
tidvattensdocka	wet dock
tippningsplats	spoil ground
topp	summit
torn	tower
torrdocka	drydock
triangelpunkt	triangulation point
tunga	tongue

U

udde	cape, point, headland
undervattenskabel	submarine cable
undre	lower
utkikstorn	lookout tower

V

vagbrytare	breakwater
vaderkvarn	windmill
vall	steep coast
varv	shipyard
vast, vest	west
vastra, vastlig	western
vatten	water
vattenstandssignalstation	tide signal station
vattentorn	water tower
vik	bay, creek
vit	white
vrak	wreck
vrakboj	wreck or obstruction buoy

Y

ytstrom	surface current
yttre, ytter	outer

How to use the Index—Gazetteer

Geographic names of navigational features are generally those used by the nation having sovereignty and are listed alphabetically. Diacritical marks, such as accents, cedillas, and circumflexes, which are related to specific letters in certain foreign languages, are not used in the interest of typographical simplicity.

Geographic names or their spellings do not necessarily reflect recognition of the political status of an area by the United States Government. Positions are approximate and are intended merely as locators to facilitate reference to the charts.

To use as a Gazetteer note the position and Sector number of the feature and refer to the Chart Information diagram for the Sector. Plot the approximate position of the feature on this diagram and note the approximate chart number.

To use as an Index of features described in the text note the paragraph number at the right. To locate this feature on the best scale chart use the Gazetteer procedure above.

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